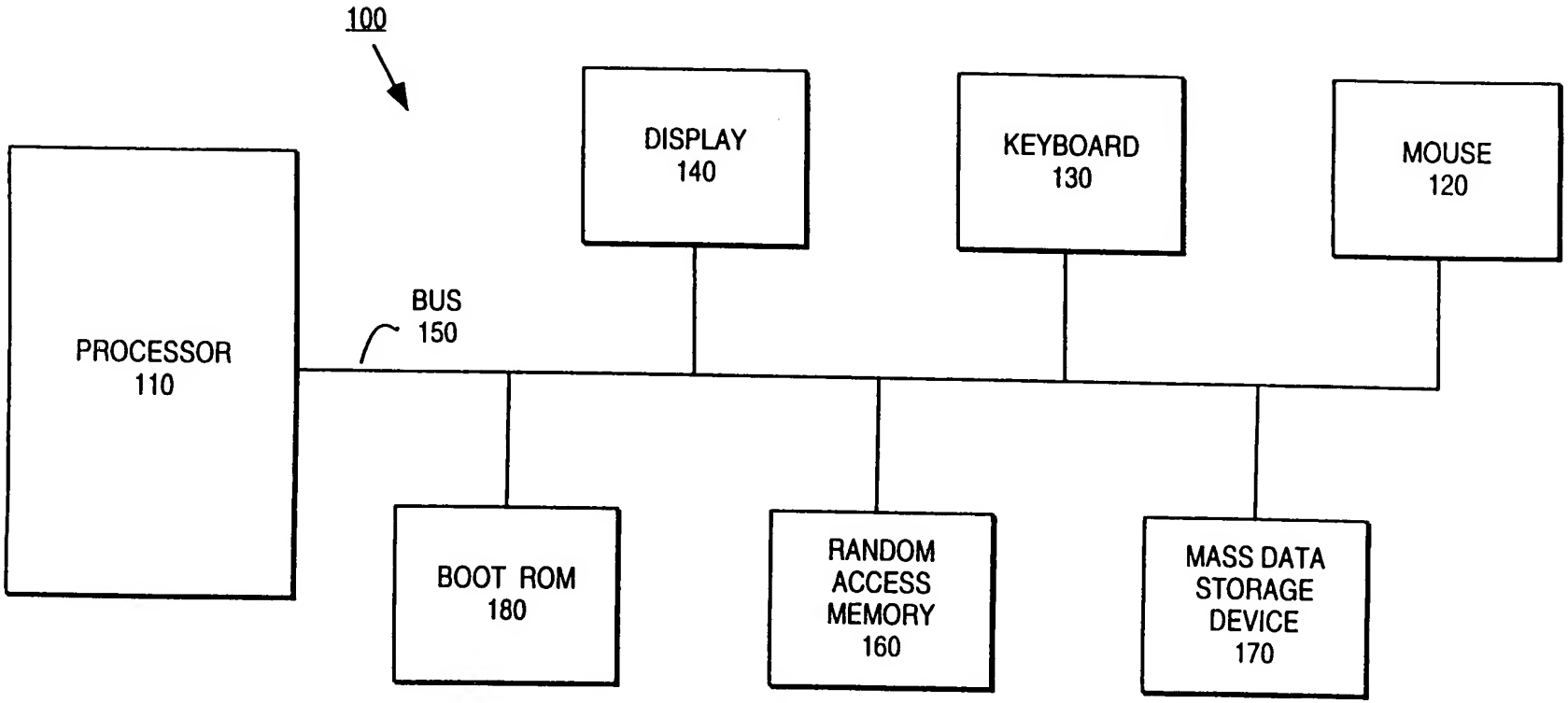
100
DISPLAY
140
KEYBOARD
130
MOUSE
120
PROCESSOR
110
BUS
150
BOOT ROM
180
RANDOM
ACCESS
MEMORY
160
MASS DATA
STORAGE
DEVICE
170

Figure 1

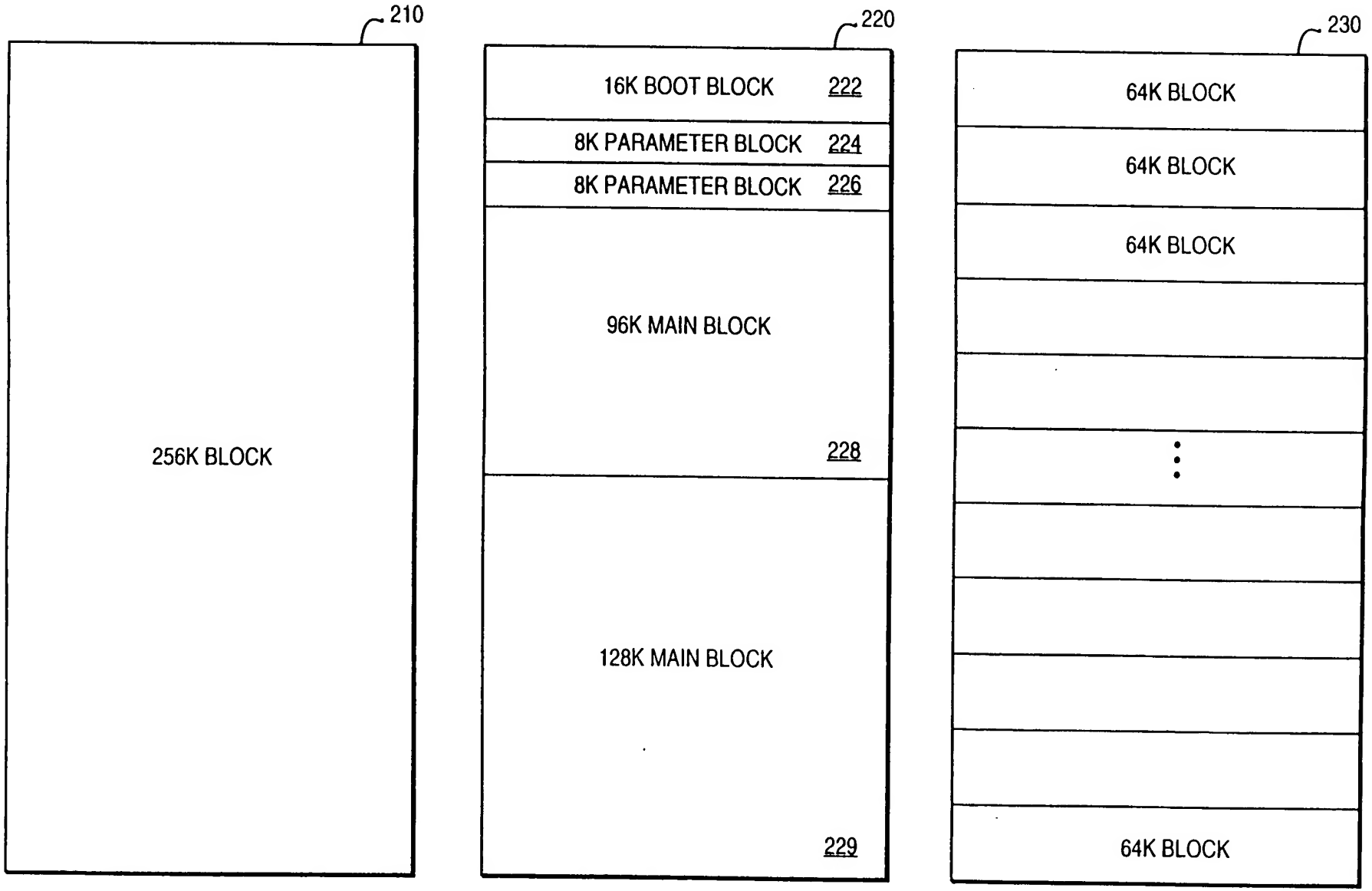
210
256K BLOCK
220
16K BOOT BLOCK 222
8K PARAMETER BLOCK 224
8K PARAMETER BLOCK 226
96K MAIN BLOCK
228
128K MAIN BLOCK
229
230
64K BLOCK
64K BLOCK
64K BLOCK
64K BLOCK

Figure 2

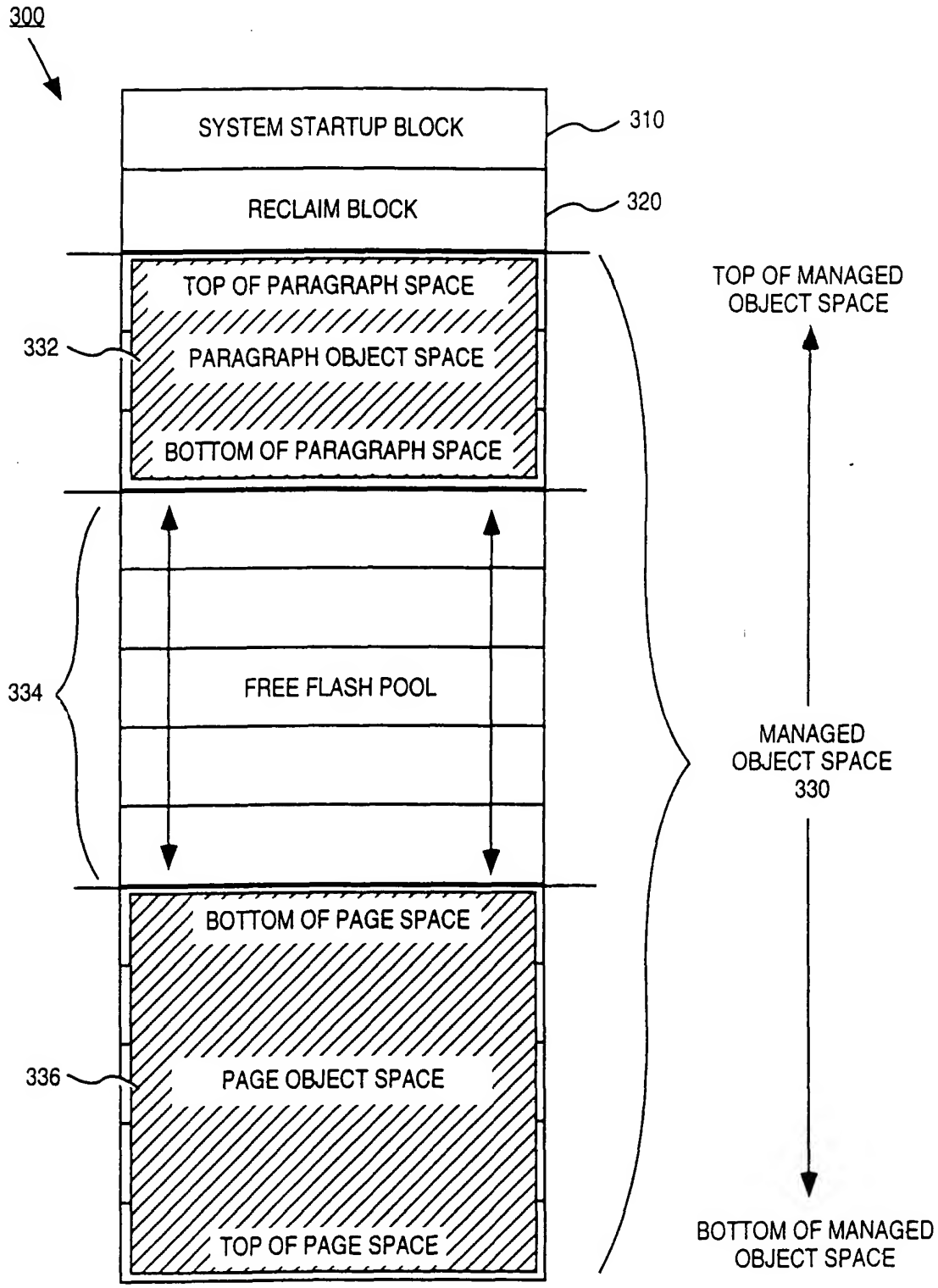
300
SYSTEM STARTUP BLOCK
310
RECLAIM BLOCK
320
TOP OF PARAGRAPH SPACE
332
PARAGRAPH OBJECT SPACE
BOTTOM OF PARAGRAPH SPACE
TOP OF MANAGED OBJECT SPACE
334
FREE FLASH POOL
MANAGED OBJECT SPACE 330
BOTTOM OF PAGE SPACE
336
PAGE OBJECT SPACE
TOP OF PAGE SPACE
BOTTOM OF MANAGED OBJECT SPACE

Figure 3

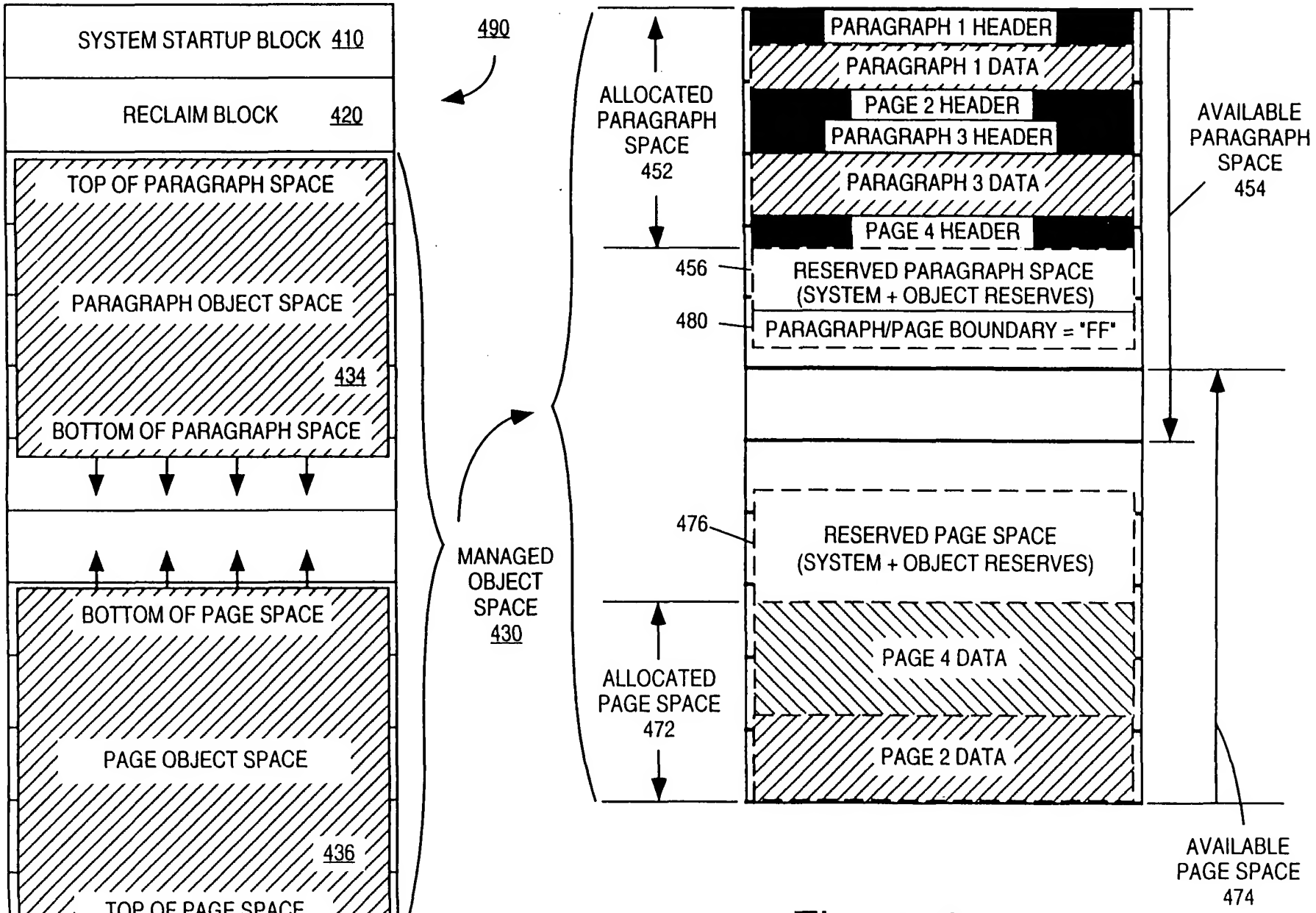
SYSTEM STARTUP BLOCK 410
RECLAIM BLOCK 420
TOP OF PARAGRAPH SPACE
PARAGRAPH OBJECT SPACE
434
BOTTOM OF PARAGRAPH SPACE
BOTTOM OF PAGE SPACE
PAGE OBJECT SPACE
436
TOP OF PAGE SPACE
490
MANAGED OBJECT SPACE 430
ALLOCATED PARAGRAPH SPACE 452
ALLOCATED PAGE SPACE 472
PARAGRAPH 1 HEADER
PARAGRAPH 1 DATA
PAGE 2 HEADER
PARAGRAPH 3 HEADER
PARAGRAPH 3 DATA
PAGE 4 HEADER
456
RESERVED PARAGRAPH SPACE (SYSTEM + OBJECT RESERVES)
480
PARAGRAPH/PAGE BOUNDARY = "FF"
476
RESERVED PAGE SPACE (SYSTEM + OBJECT RESERVES)
PAGE 4 DATA
PAGE 2 DATA
AVAILABLE PARAGRAPH SPACE 454
AVAILABLE PAGE SPACE 474

Figure 4

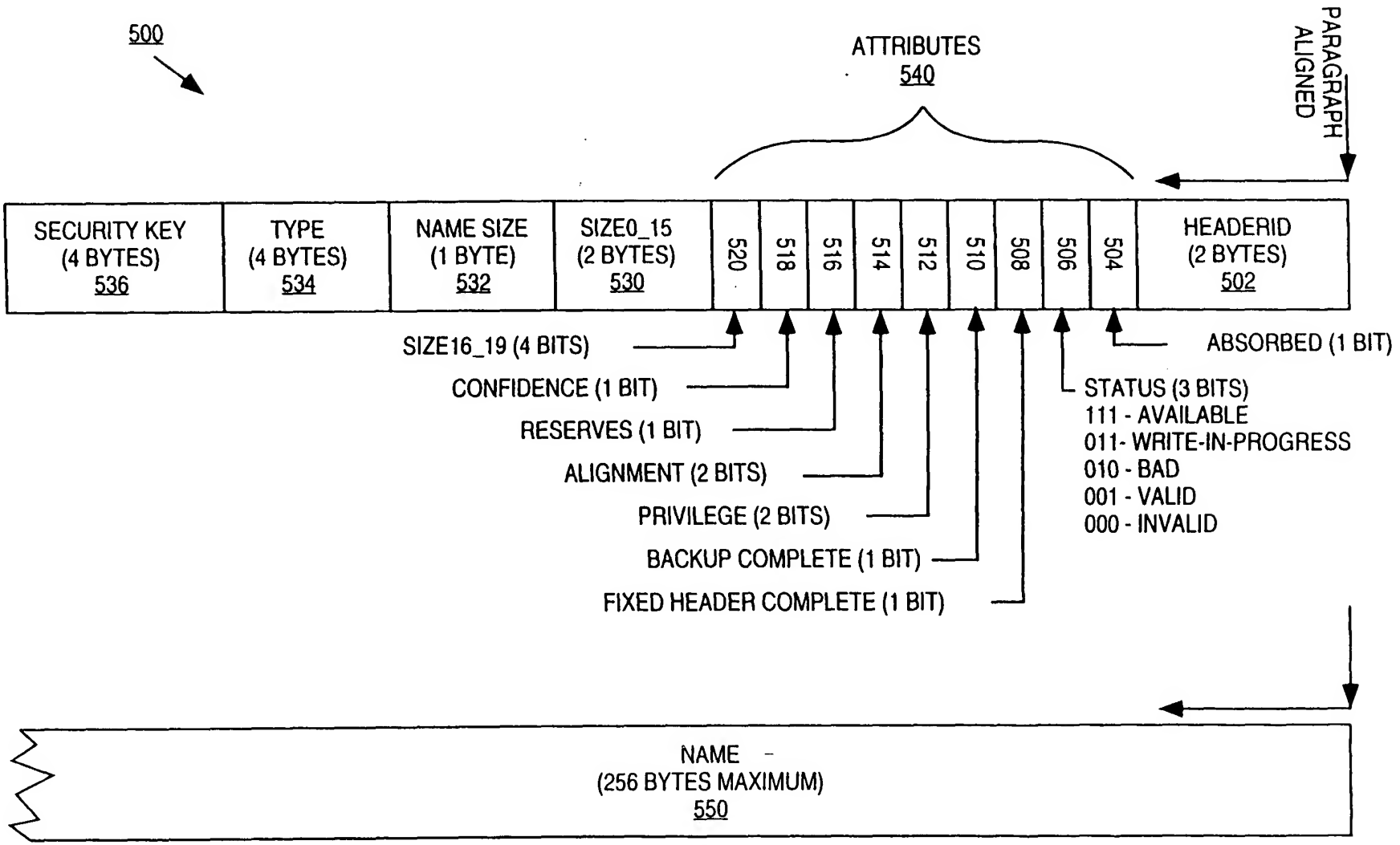
500
ATTRIBUTES
540
PARAGRAPH ALIGNED
SECURITY KEY (4 BYTES) 536
TYPE (4 BYTES) 534
NAME SIZE (1 BYTE) 532
SIZE0_15 (2 BYTES) 530
520
518
516
514
512
510
508
506
504
HEADERID (2 BYTES) 502
SIZE16_19 (4 BITS)
CONFIDENCE (1 BIT)
RESERVES (1 BIT)
ALIGNMENT (2 BITS)
PRIVILEGE (2 BITS)
BACKUP COMPLETE (1 BIT)
FIXED HEADER COMPLETE (1 BIT)
ABSORBED (1 BIT)
STATUS (3 BITS)
111 - AVAILABLE
011- WRITE-IN-PROGRESS
010 - BAD
001 - VALID
000 - INVALID
NAME
(256 BYTES MAXIMUM)
550

Figure 5

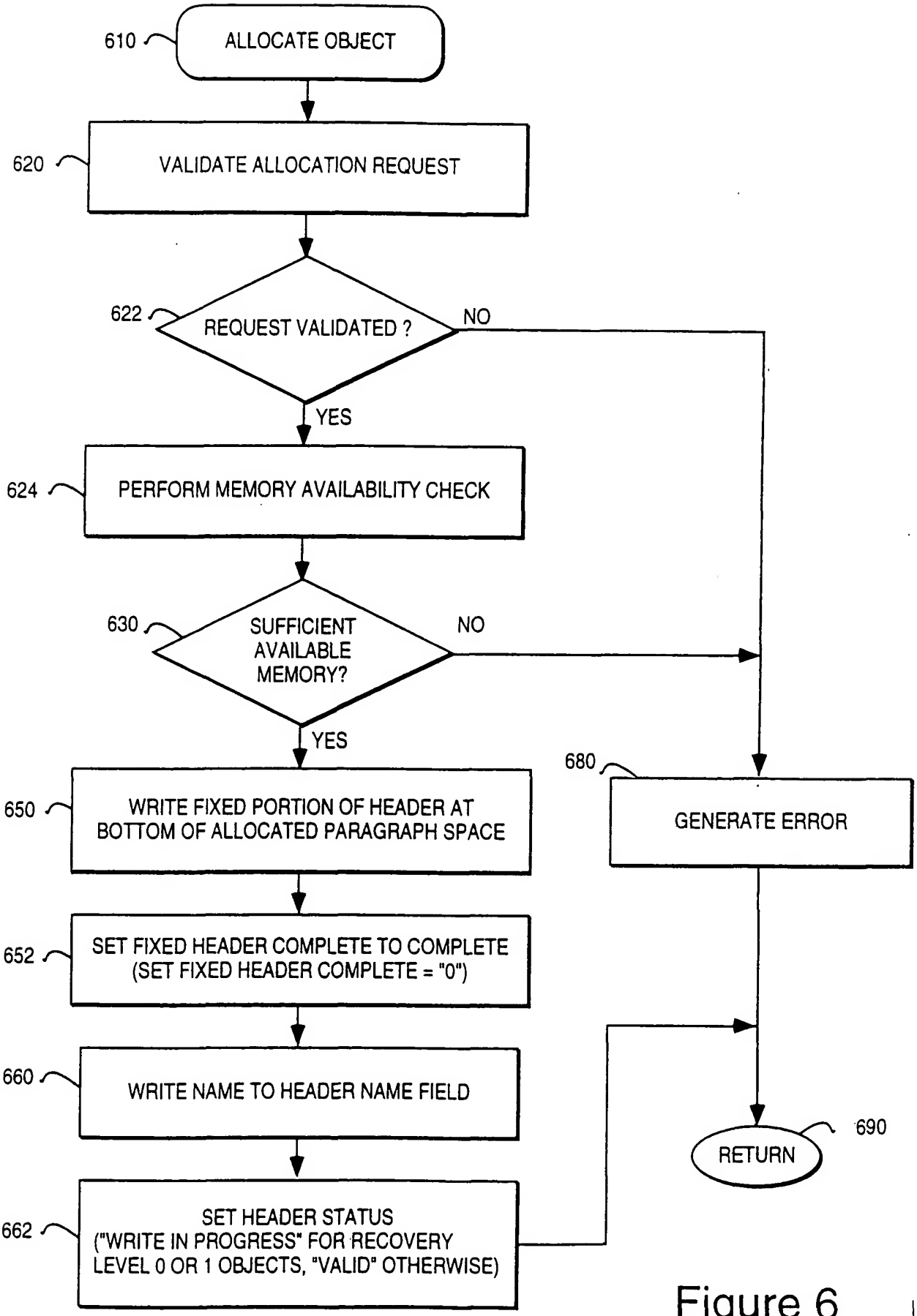
610
ALLOCATE OBJECT
620
VALIDATE ALLOCATION REQUEST
622
REQUEST VALIDATED ?
NO
YES
624
PERFORM MEMORY AVAILABILITY CHECK
630
SUFFICIENT AVAILABLE MEMORY?
NO
YES
650
WRITE FIXED PORTION OF HEADER AT BOTTOM OF ALLOCATED PARAGRAPH SPACE
652
SET FIXED HEADER COMPLETE TO COMPLETE (SET FIXED HEADER COMPLETE = "0")
660
WRITE NAME TO HEADER NAME FIELD
662
SET HEADER STATUS ("WRITE IN PROGRESS" FOR RECOVERY LEVEL 0 OR 1 OBJECTS, "VALID" OTHERWISE)
680
GENERATE ERROR
690
RETURN

Figure 6

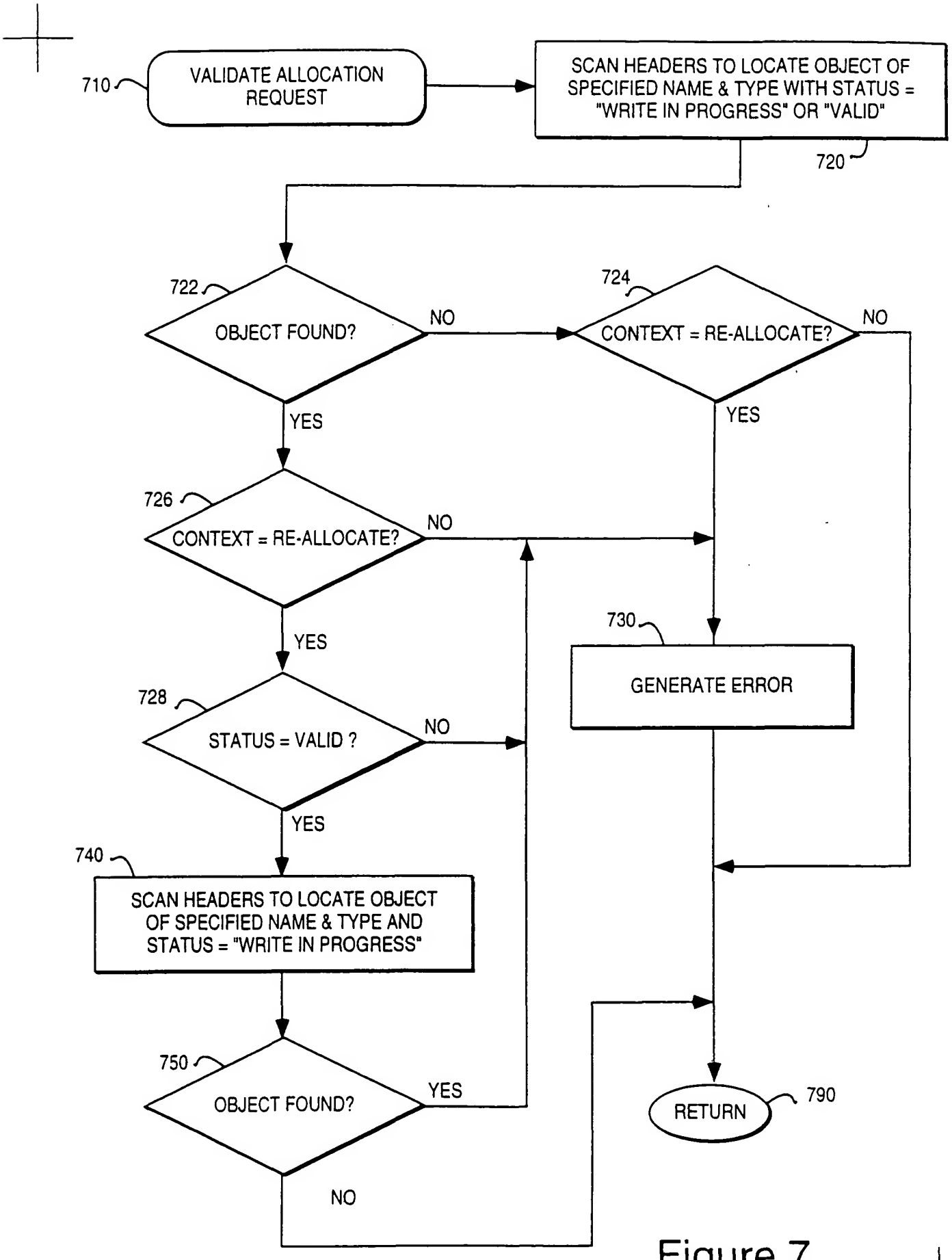
710
VALIDATE ALLOCATION REQUEST
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME & TYPE WITH STATUS = "WRITE IN PROGRESS" OR "VALID"
720
722
OBJECT FOUND?
NO
724
CONTEXT = RE-ALLOCATE?
NO
YES
YES
726
CONTEXT = RE-ALLOCATE?
NO
YES
730
GENERATE ERROR
728
STATUS = VALID ?
NO
YES
740
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME & TYPE AND STATUS = "WRITE IN PROGRESS"
750
OBJECT FOUND?
YES
NO
790
RETURN

Figure 7

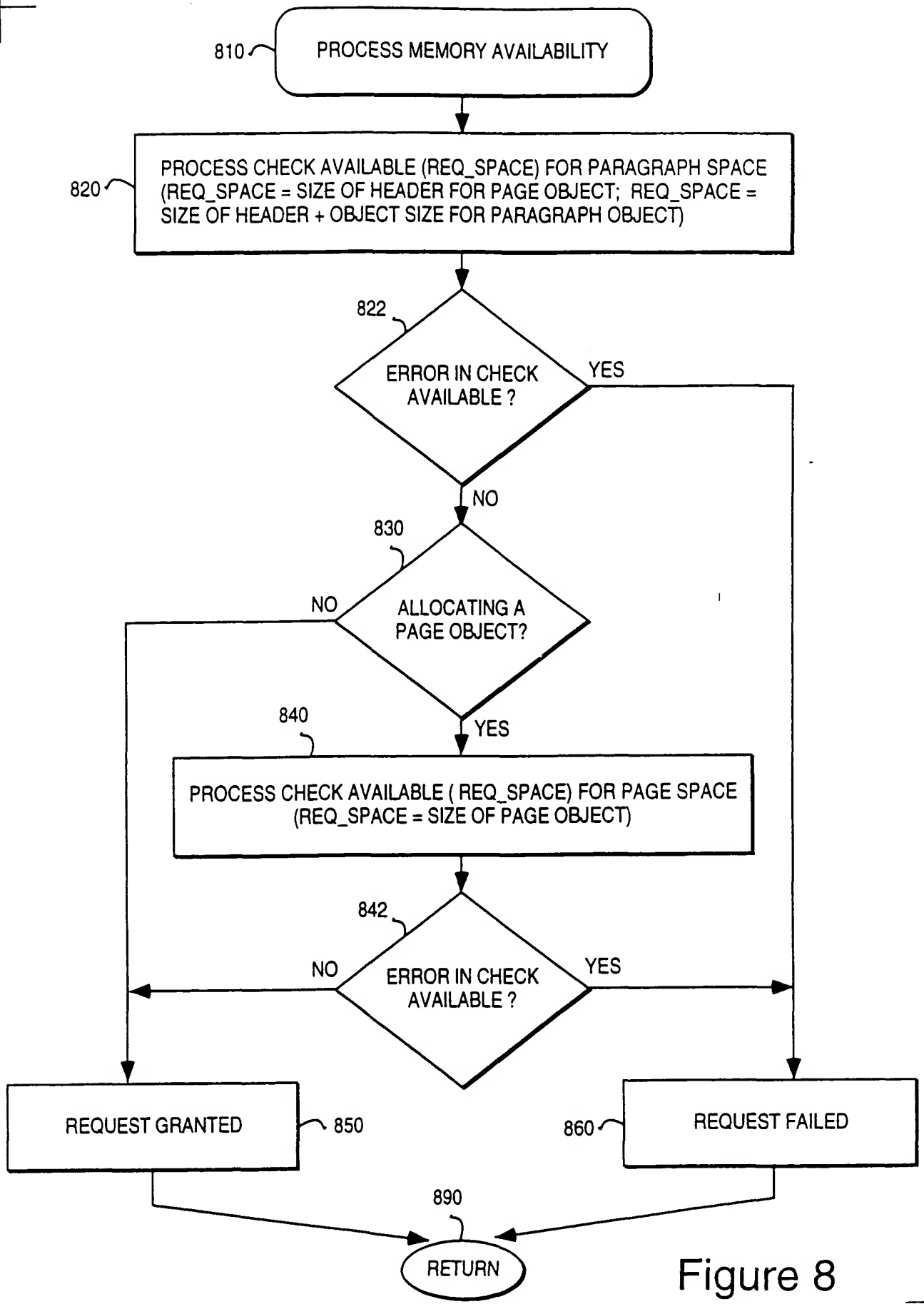
810
PROCESS MEMORY AVAILABILITY
820
PROCESS CHECK AVAILABLE (REQ_SPACE) FOR PARAGRAPH SPACE (REQ_SPACE = SIZE OF HEADER FOR PAGE OBJECT; REQ_SPACE = SIZE OF HEADER + OBJECT SIZE FOR PARAGRAPH OBJECT)
822
ERROR IN CHECK AVAILABLE ?
YES
NO
830
ALLOCATING A PAGE OBJECT?
NO
YES
840
PROCESS CHECK AVAILABLE (REQ_SPACE) FOR PAGE SPACE (REQ_SPACE = SIZE OF PAGE OBJECT)
842
ERROR IN CHECK AVAILABLE ?
NO
YES
REQUEST GRANTED
850
860
REQUEST FAILED
890
RETURN

Figure 8

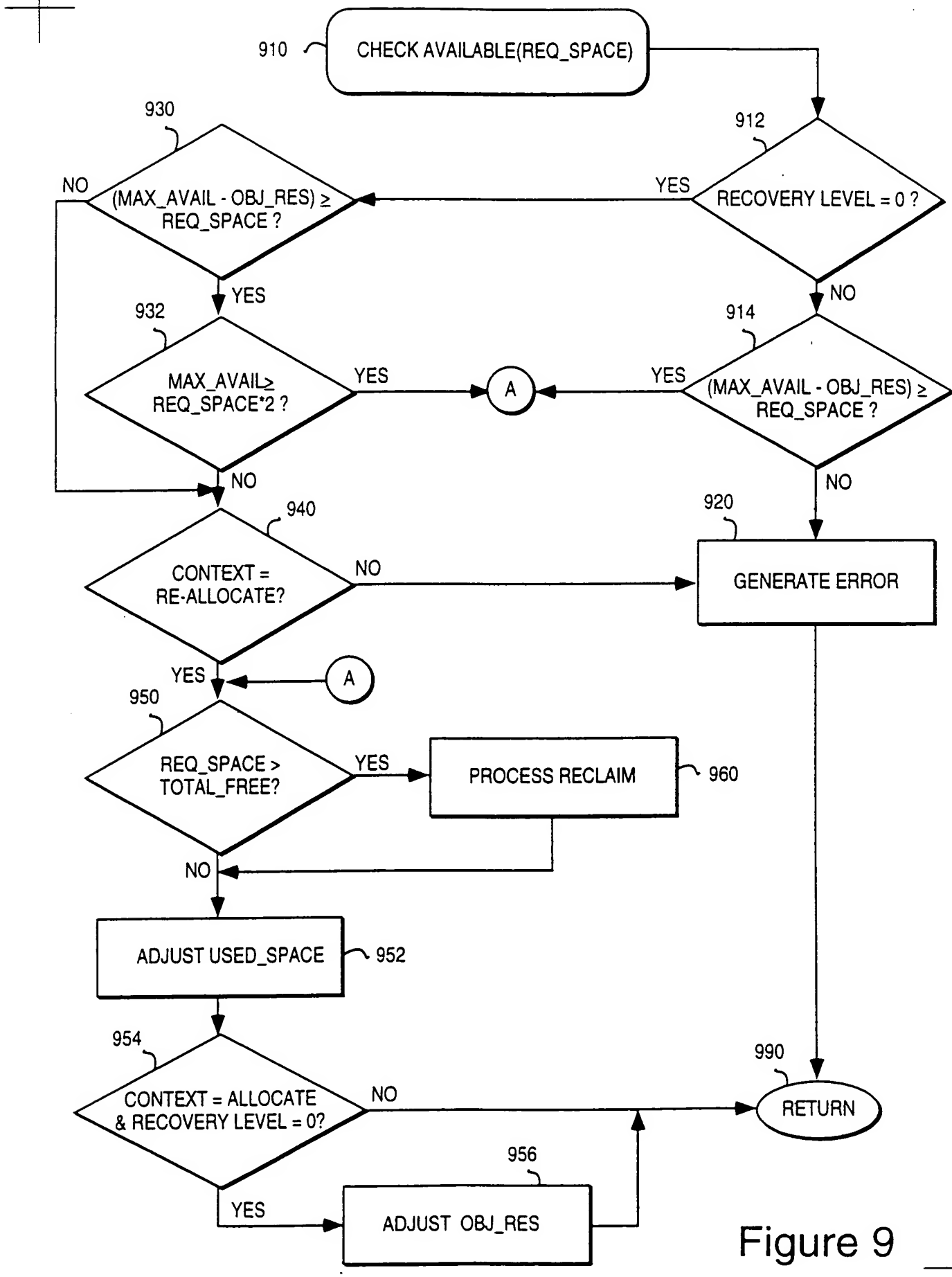
910
CHECK AVAILABLE(REQ_SPACE)
912
RECOVERY LEVEL = 0 ?
YES
930
(MAX_AVAIL - OBJ_RES) ≥ REQ_SPACE ?
NO
YES
932
MAX_AVAIL≥ REQ_SPACE*2 ?
YES
A
914
(MAX_AVAIL - OBJ_RES) ≥ REQ_SPACE ?
YES
NO
NO
940
CONTEXT = RE-ALLOCATE?
NO
920
GENERATE ERROR
YES
A
950
REQ_SPACE > TOTAL_FREE?
YES
PROCESS RECLAIM
960
NO
ADJUST USED_SPACE
952
954
CONTEXT = ALLOCATE & RECOVERY LEVEL = 0?
NO
990
RETURN
956
YES
ADJUST OBJ_RES

Figure 9

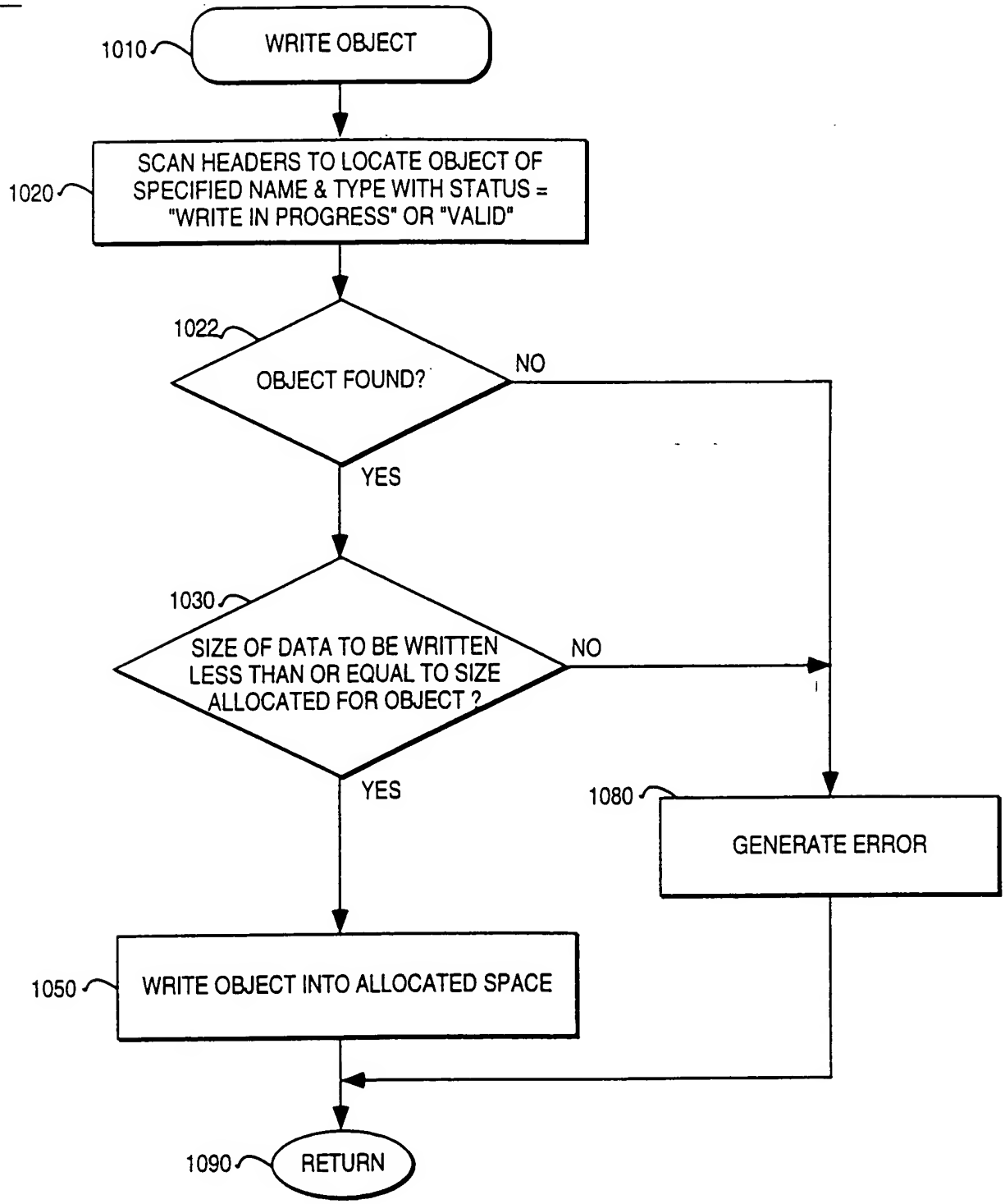
1010
WRITE OBJECT
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME & TYPE WITH STATUS = "WRITE IN PROGRESS" OR "VALID"
1020
1022
OBJECT FOUND?
NO
YES
1030
SIZE OF DATA TO BE WRITTEN LESS THAN OR EQUAL TO SIZE ALLOCATED FOR OBJECT ?
NO
YES
1080
GENERATE ERROR
1050
WRITE OBJECT INTO ALLOCATED SPACE
1090
RETURN

Figure 10

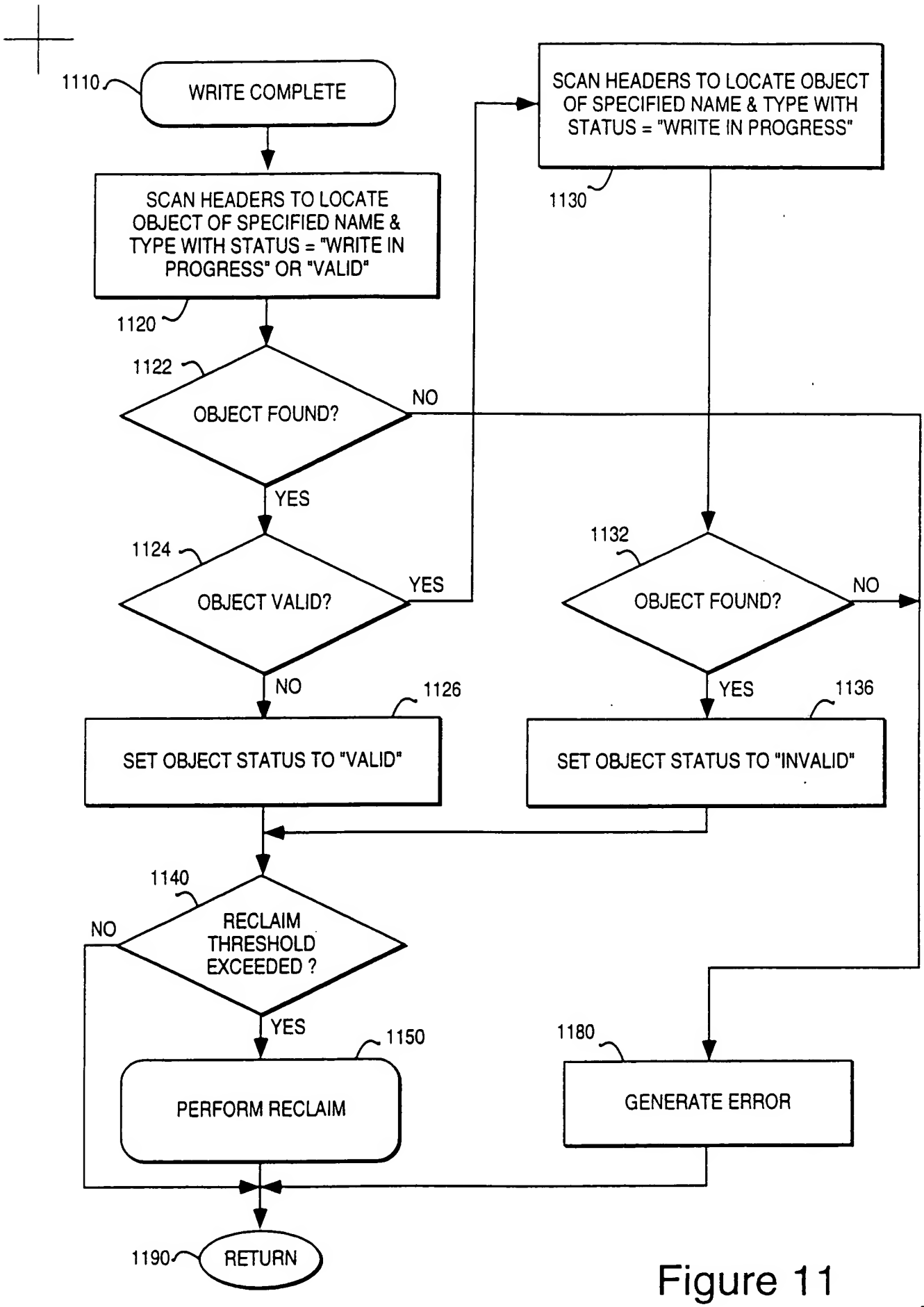
1110
WRITE COMPLETE
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME & TYPE WITH STATUS = "WRITE IN PROGRESS" OR "VALID"
1120
1122
OBJECT FOUND?
NO
YES
1124
OBJECT VALID?
YES
NO
1126
SET OBJECT STATUS TO "VALID"
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME & TYPE WITH STATUS = "WRITE IN PROGRESS"
1130
1132
OBJECT FOUND?
NO
YES
1136
SET OBJECT STATUS TO "INVALID"
1140
RECLAIM THRESHOLD EXCEEDED ?
NO
YES
1150
PERFORM RECLAIM
1180
GENERATE ERROR
1190
RETURN

Figure 11

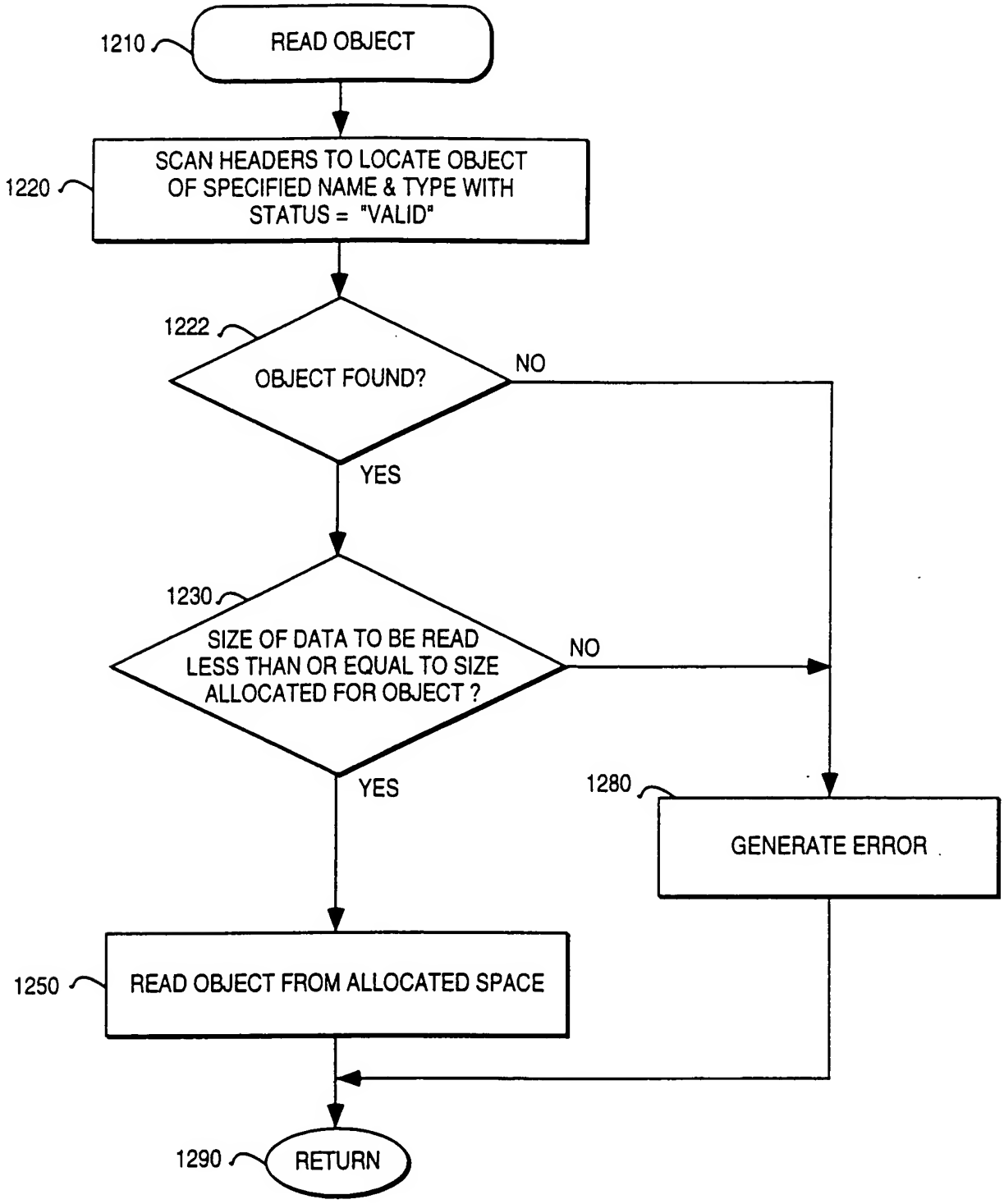
1210
READ OBJECT
1220
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME & TYPE WITH STATUS = "VALID"
1222
OBJECT FOUND?
NO
YES
1230
SIZE OF DATA TO BE READ LESS THAN OR EQUAL TO SIZE ALLOCATED FOR OBJECT ?
NO
YES
1280
GENERATE ERROR
1250
READ OBJECT FROM ALLOCATED SPACE
1290
RETURN

Figure 12

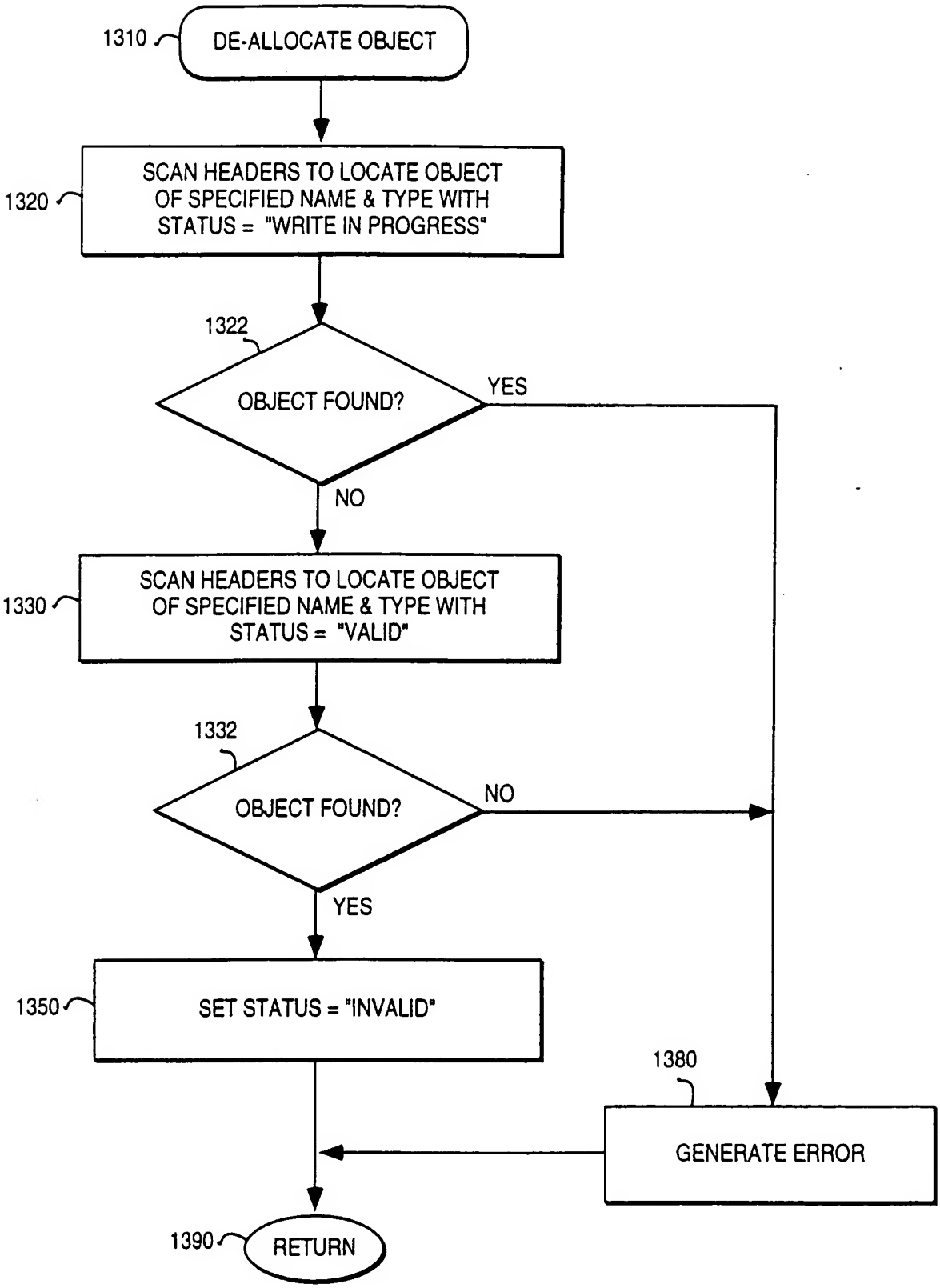
1310
DE-ALLOCATE OBJECT
1320
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME & TYPE WITH STATUS = "WRITE IN PROGRESS"
1322
OBJECT FOUND?
YES
NO
1330
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME & TYPE WITH STATUS = "VALID"
1332
OBJECT FOUND?
NO
YES
1350
SET STATUS = "INVALID"
1380
GENERATE ERROR
1390
RETURN

Figure 13

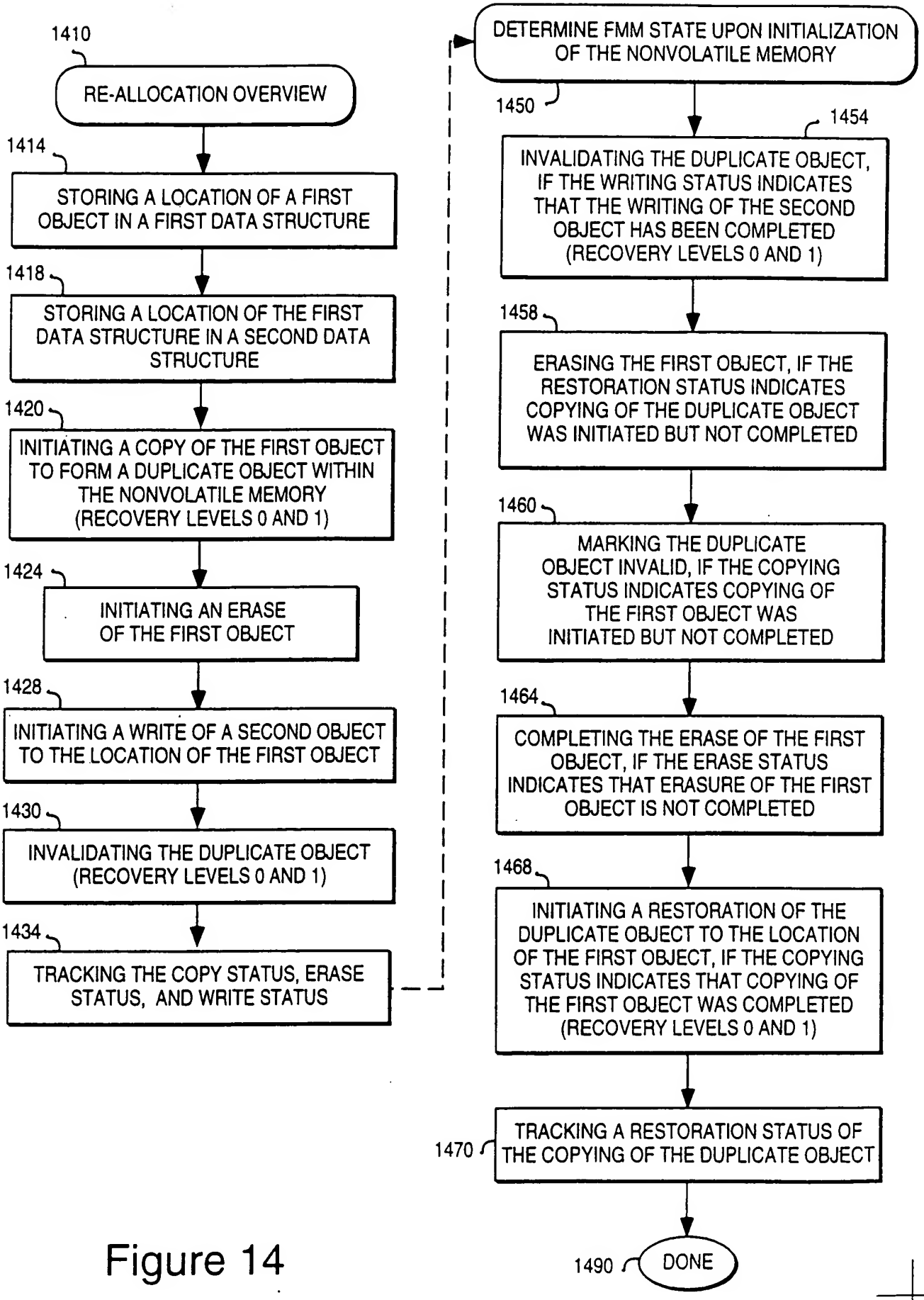
1410
RE-ALLOCATION OVERVIEW
1414
STORING A LOCATION OF A FIRST OBJECT IN A FIRST DATA STRUCTURE
1418
STORING A LOCATION OF THE FIRST DATA STRUCTURE IN A SECOND DATA STRUCTURE
1420
INITIATING A COPY OF THE FIRST OBJECT TO FORM A DUPLICATE OBJECT WITHIN THE NONVOLATILE MEMORY (RECOVERY LEVELS 0 AND 1)
1424
INITIATING AN ERASE OF THE FIRST OBJECT
1428
INITIATING A WRITE OF A SECOND OBJECT TO THE LOCATION OF THE FIRST OBJECT
1430
INVALIDATING THE DUPLICATE OBJECT (RECOVERY LEVELS 0 AND 1)
1434
TRACKING THE COPY STATUS, ERASE STATUS, AND WRITE STATUS
DETERMINE FMM STATE UPON INITIALIZATION OF THE NONVOLATILE MEMORY
1450
1454
INVALIDATING THE DUPLICATE OBJECT, IF THE WRITING STATUS INDICATES THAT THE WRITING OF THE SECOND OBJECT HAS BEEN COMPLETED (RECOVERY LEVELS 0 AND 1)
1458
ERASING THE FIRST OBJECT, IF THE RESTORATION STATUS INDICATES COPYING OF THE DUPLICATE OBJECT WAS INITIATED BUT NOT COMPLETED
1460
MARKING THE DUPLICATE OBJECT INVALID, IF THE COPYING STATUS INDICATES COPYING OF THE FIRST OBJECT WAS INITIATED BUT NOT COMPLETED
1464
COMPLETING THE ERASE OF THE FIRST OBJECT, IF THE ERASE STATUS INDICATES THAT ERASURE OF THE FIRST OBJECT IS NOT COMPLETED
1468
INITIATING A RESTORATION OF THE DUPLICATE OBJECT TO THE LOCATION OF THE FIRST OBJECT, IF THE COPYING STATUS INDICATES THAT COPYING OF THE FIRST OBJECT WAS COMPLETED (RECOVERY LEVELS 0 AND 1)
1470
TRACKING A RESTORATION STATUS OF THE COPYING OF THE DUPLICATE OBJECT
1490
DONE

Figure 14

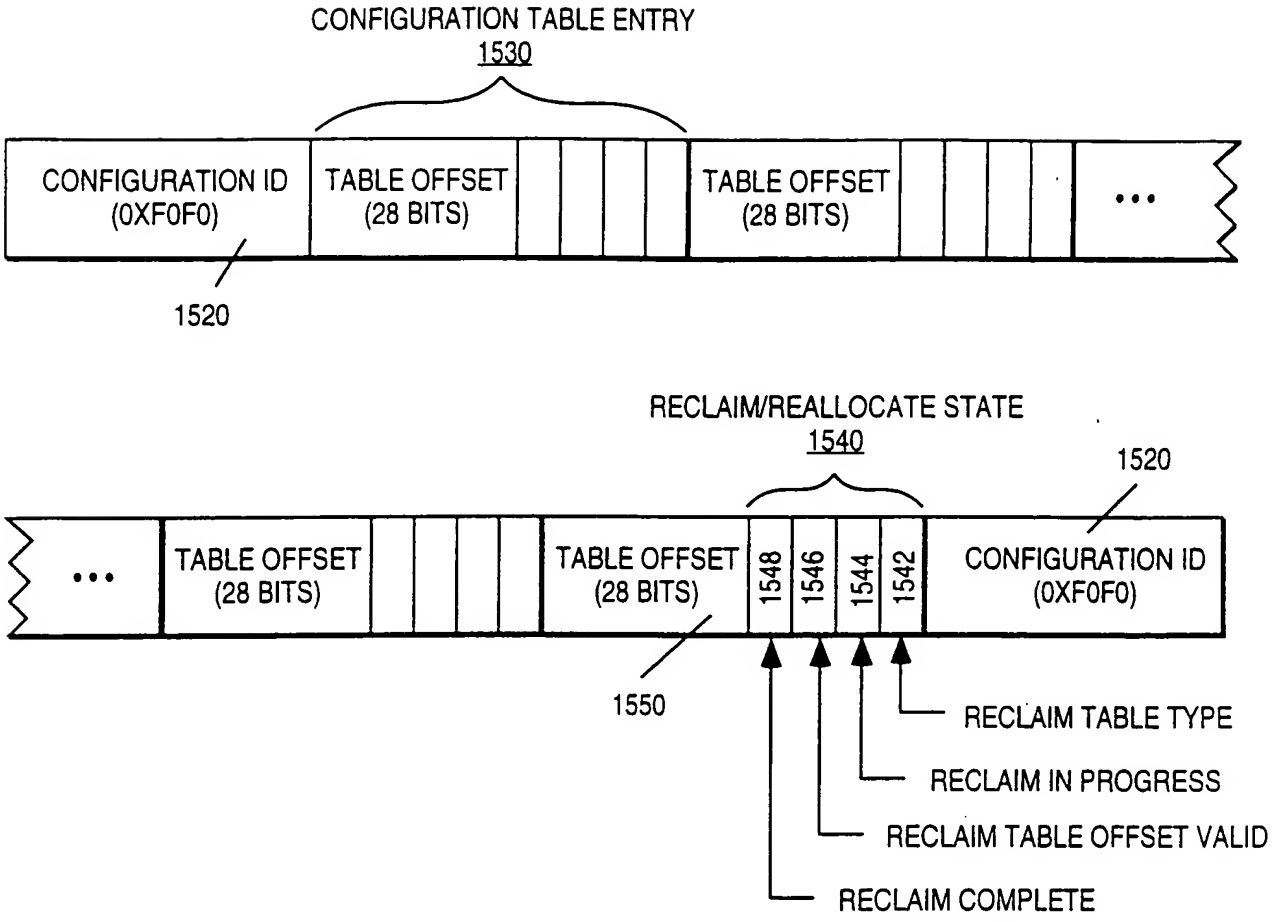

Figure 15

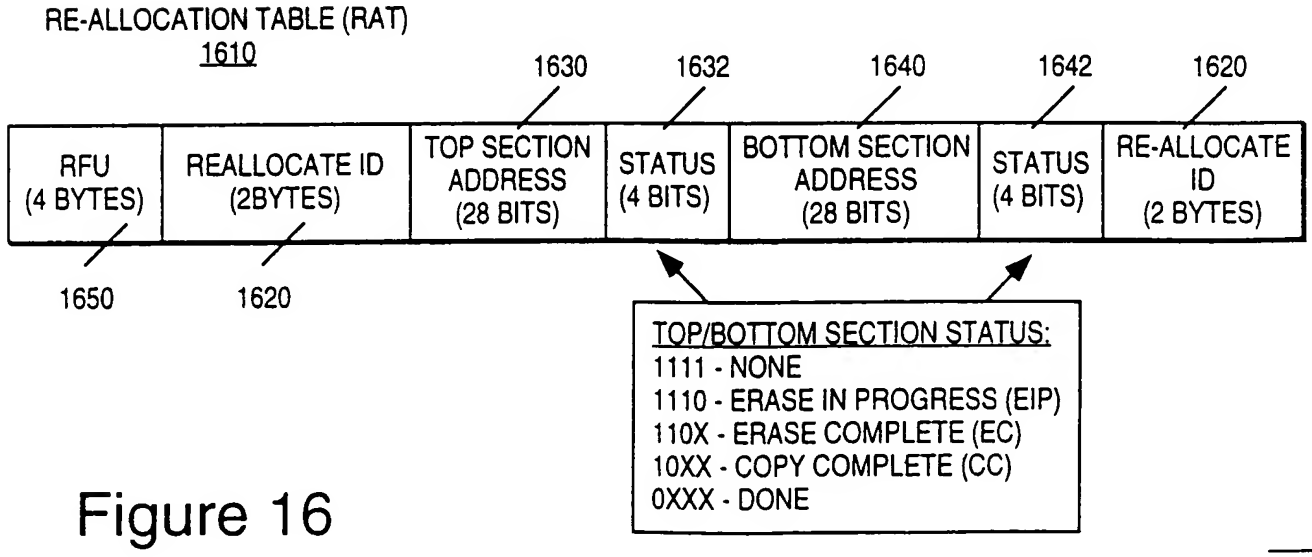

Figure 16

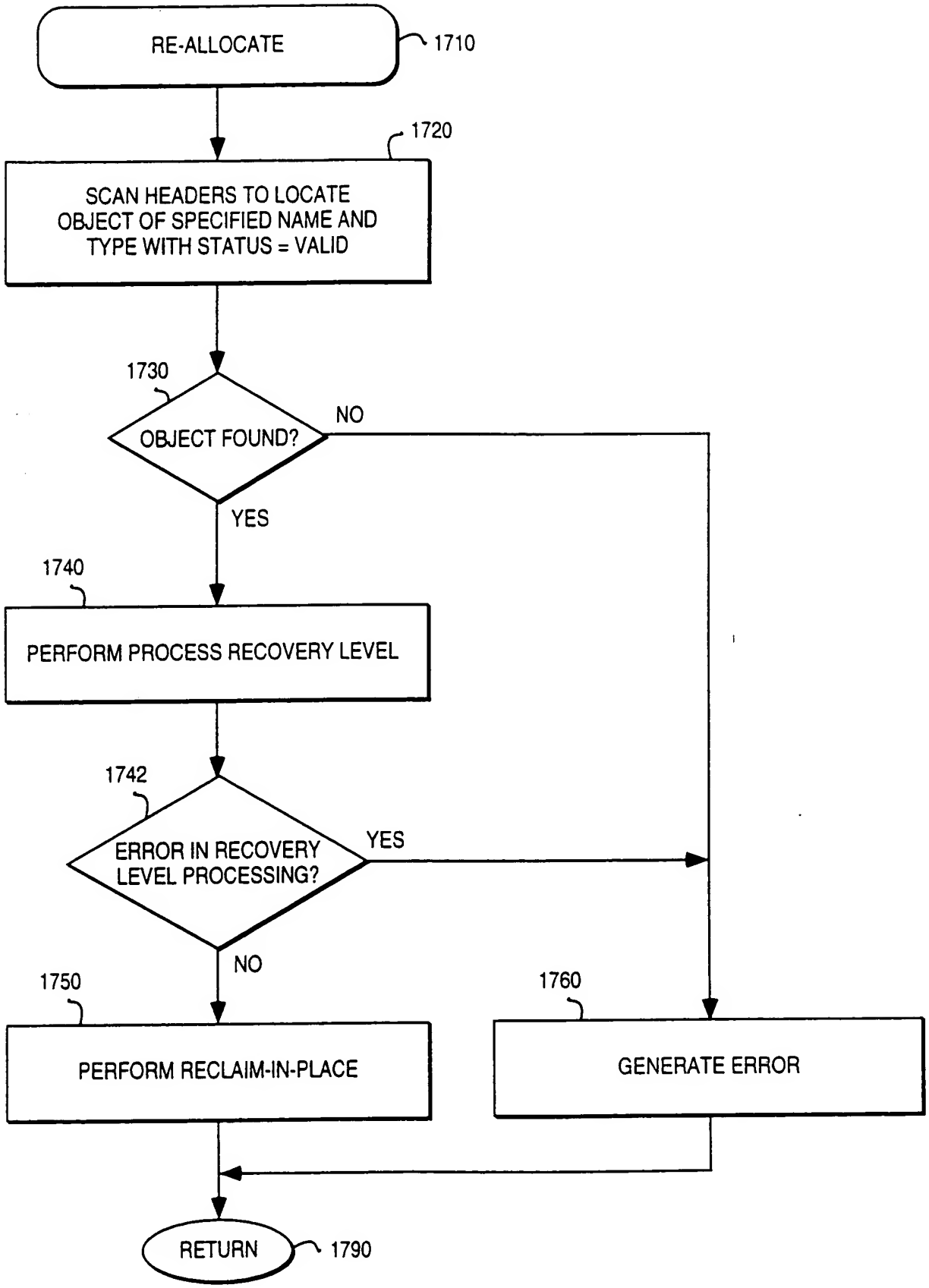
RE-ALLOCATE
1710
1720
SCAN HEADERS TO LOCATE OBJECT OF SPECIFIED NAME AND TYPE WITH STATUS = VALID
1730
OBJECT FOUND?
NO
YES
1740
PERFORM PROCESS RECOVERY LEVEL
1742
ERROR IN RECOVERY LEVEL PROCESSING?
YES
NO
1750
PERFORM RECLAIM-IN-PLACE
1760
GENERATE ERROR
RETURN
1790

Figure 17

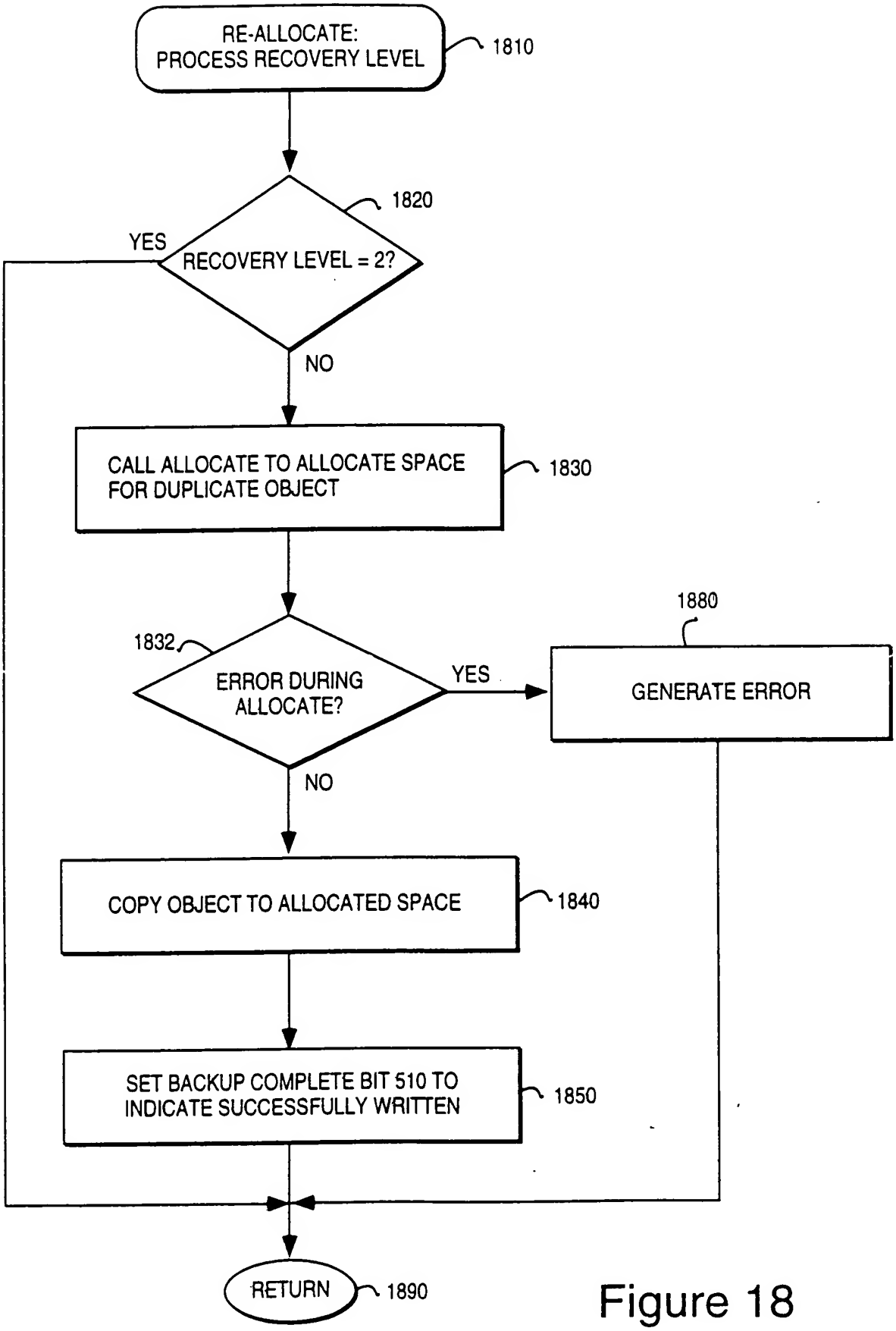
RE-ALLOCATE:
PROCESS RECOVERY LEVEL
1810
1820
YES
RECOVERY LEVEL = 2?
NO
CALL ALLOCATE TO ALLOCATE SPACE
FOR DUPLICATE OBJECT
1830
1880
1832
ERROR DURING
ALLOCATE?
YES
GENERATE ERROR
NO
COPY OBJECT TO ALLOCATED SPACE
1840
SET BACKUP COMPLETE BIT 510 TO
INDICATE SUCCESSFULLY WRITTEN
1850
RETURN
1890

Figure 18

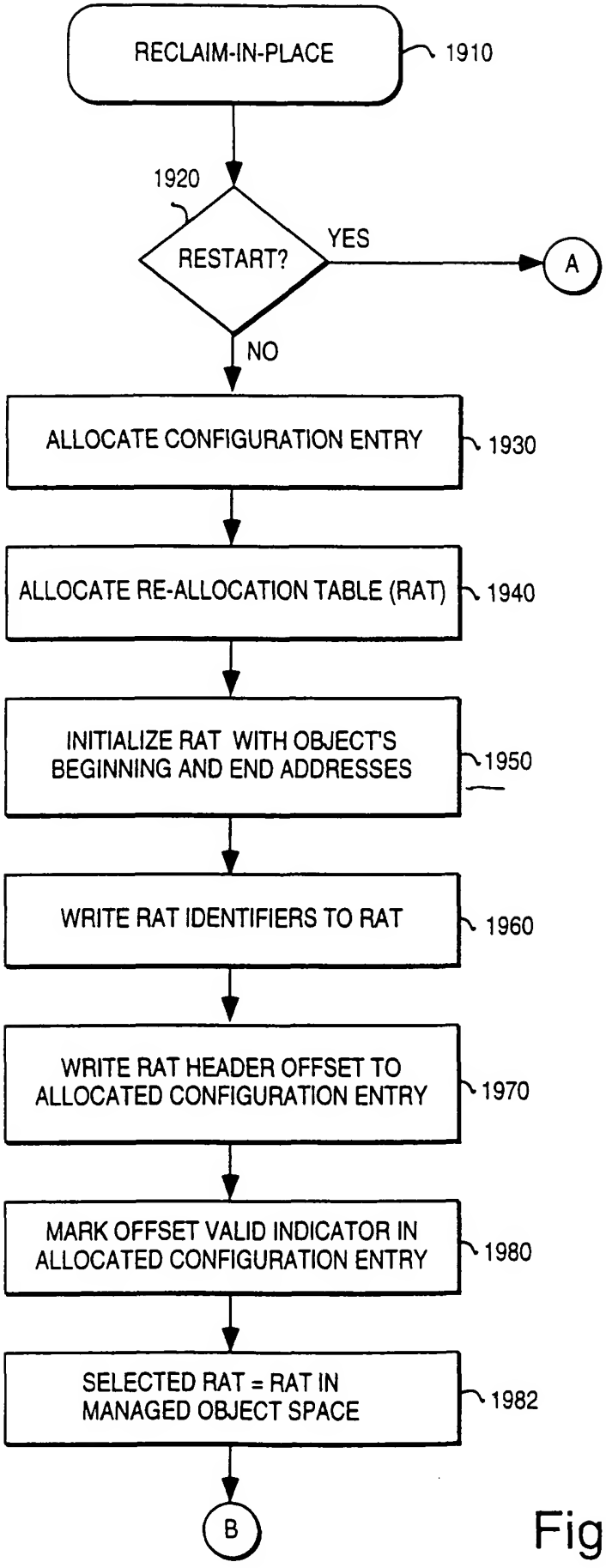
RECLAIM-IN-PLACE
1910
1920
RESTART?
YES
A
NO
ALLOCATE CONFIGURATION ENTRY
1930
ALLOCATE RE-ALLOCATION TABLE (RAT)
1940
INITIALIZE RAT WITH OBJECT'S BEGINNING AND END ADDRESSES
1950
WRITE RAT IDENTIFIERS TO RAT
1960
WRITE RAT HEADER OFFSET TO ALLOCATED CONFIGURATION ENTRY
1970
MARK OFFSET VALID INDICATOR IN ALLOCATED CONFIGURATION ENTRY
1980
SELECTED RAT = RAT IN MANAGED OBJECT SPACE
1982
B

Figure 19

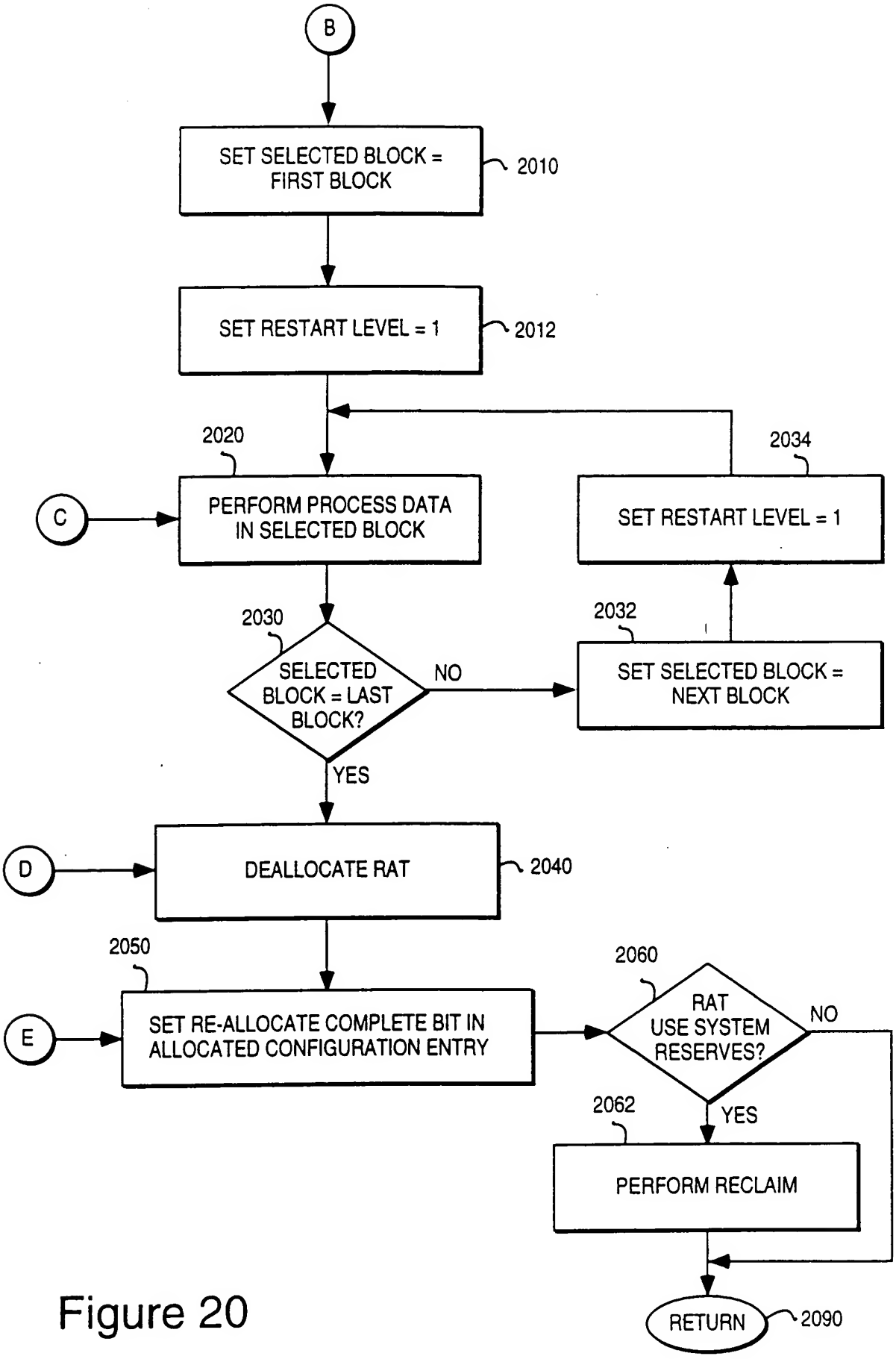
B
SET SELECTED BLOCK = FIRST BLOCK
2010
SET RESTART LEVEL = 1
2012
2020
PERFORM PROCESS DATA IN SELECTED BLOCK
C
2034
SET RESTART LEVEL = 1
2030
SELECTED BLOCK = LAST BLOCK?
NO
2032
SET SELECTED BLOCK = NEXT BLOCK
YES
D
DEALLOCATE RAT
2040
2050
SET RE-ALLOCATE COMPLETE BIT IN ALLOCATED CONFIGURATION ENTRY
E
2060
RAT USE SYSTEM RESERVES?
NO
2062
YES
PERFORM RECLAIM
RETURN
2090

Figure 20

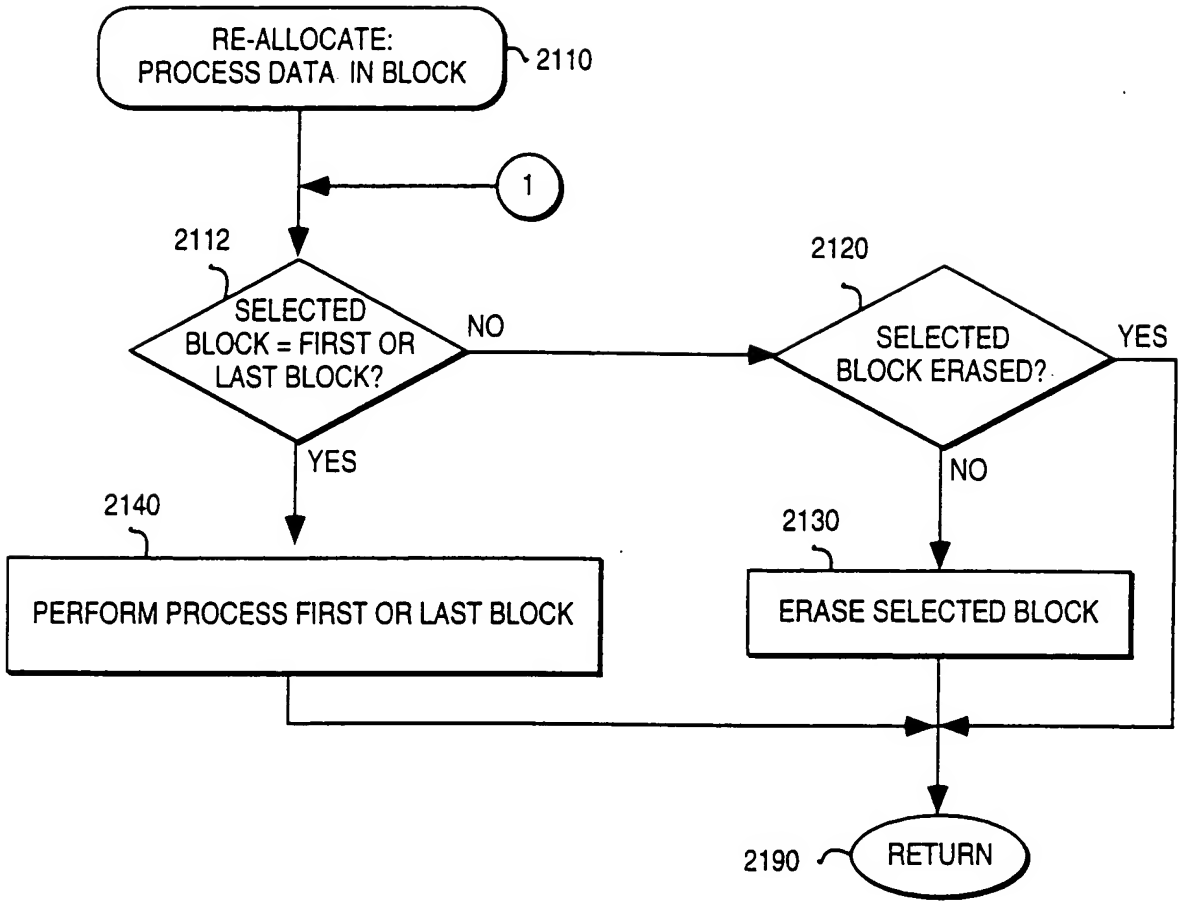
RE-ALLOCATE:
PROCESS DATA IN BLOCK
2110
1
2112
SELECTED
BLOCK = FIRST OR
LAST BLOCK?
NO
YES
2120
SELECTED
BLOCK ERASED?
YES
NO
2140
PERFORM PROCESS FIRST OR LAST BLOCK
2130
ERASE SELECTED BLOCK
2190
RETURN

Figure 21

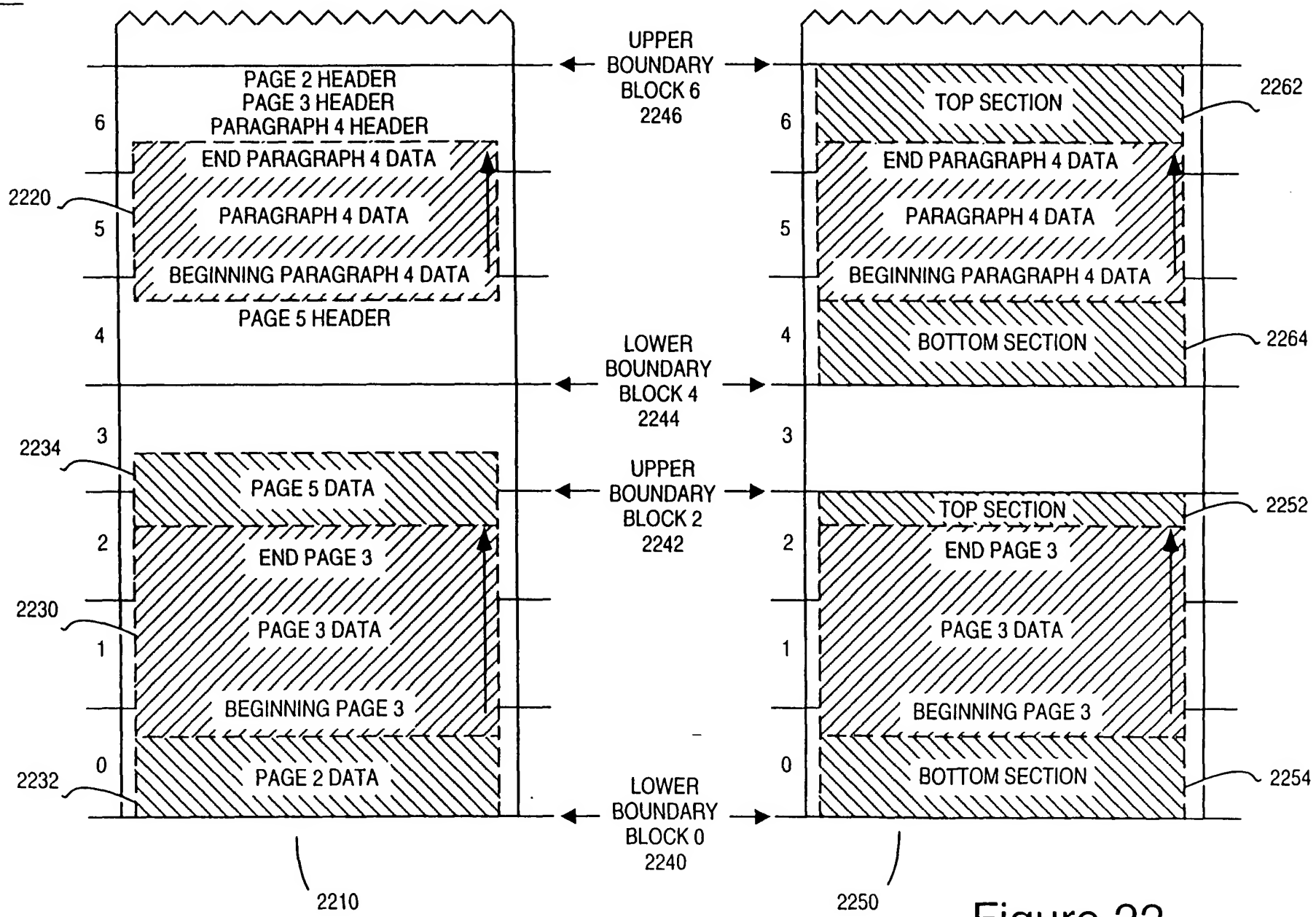
UPPER BOUNDARY BLOCK 6 2246
PAGE 2 HEADER
PAGE 3 HEADER
PARAGRAPH 4 HEADER
END PARAGRAPH 4 DATA
PARAGRAPH 4 DATA
BEGINNING PARAGRAPH 4 DATA
PAGE 5 HEADER
2220
6
5
4
3
2
1
0
LOWER BOUNDARY BLOCK 4 2244
UPPER BOUNDARY BLOCK 2 2242
LOWER BOUNDARY BLOCK 0 2240
2234
PAGE 5 DATA
END PAGE 3
2230
PAGE 3 DATA
BEGINNING PAGE 3
2232
PAGE 2 DATA
2210
TOP SECTION
2262
END PARAGRAPH 4 DATA
PARAGRAPH 4 DATA
BEGINNING PARAGRAPH 4 DATA
BOTTOM SECTION
2264
TOP SECTION
2252
END PAGE 3
PAGE 3 DATA
BEGINNING PAGE 3
BOTTOM SECTION
2254
2250

Figure 22

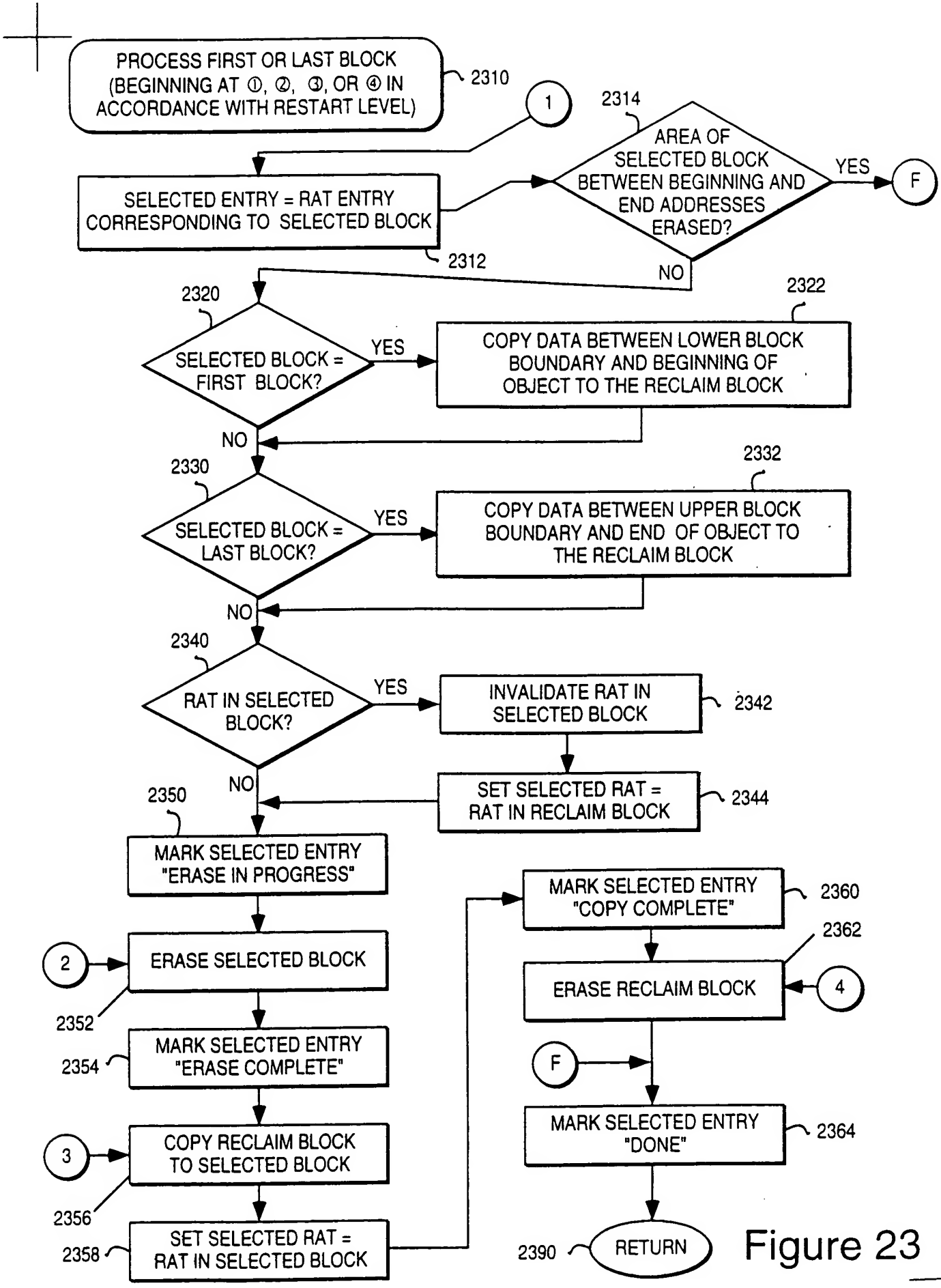
PROCESS FIRST OR LAST BLOCK (BEGINNING AT ①, ②, ③, OR ④ IN ACCORDANCE WITH RESTART LEVEL)
2310
1
SELECTED ENTRY = RAT ENTRY CORRESPONDING TO SELECTED BLOCK
2312
2314
AREA OF SELECTED BLOCK BETWEEN BEGINNING AND END ADDRESSES ERASED?
YES
F
NO
2320
SELECTED BLOCK = FIRST BLOCK?
YES
2322
COPY DATA BETWEEN LOWER BLOCK BOUNDARY AND BEGINNING OF OBJECT TO THE RECLAIM BLOCK
NO
2330
SELECTED BLOCK = LAST BLOCK?
YES
2332
COPY DATA BETWEEN UPPER BLOCK BOUNDARY AND END OF OBJECT TO THE RECLAIM BLOCK
NO
2340
RAT IN SELECTED BLOCK?
YES
INVALIDATE RAT IN SELECTED BLOCK
2342
NO
SET SELECTED RAT = RAT IN RECLAIM BLOCK
2344
2350
MARK SELECTED ENTRY "ERASE IN PROGRESS"
2
ERASE SELECTED BLOCK
2352
MARK SELECTED ENTRY "ERASE COMPLETE"
2354
3
COPY RECLAIM BLOCK TO SELECTED BLOCK
2356
SET SELECTED RAT = RAT IN SELECTED BLOCK
2358
MARK SELECTED ENTRY "COPY COMPLETE"
2360
2362
ERASE RECLAIM BLOCK
4
F
MARK SELECTED ENTRY "DONE"
2364
2390
RETURN

Figure 23

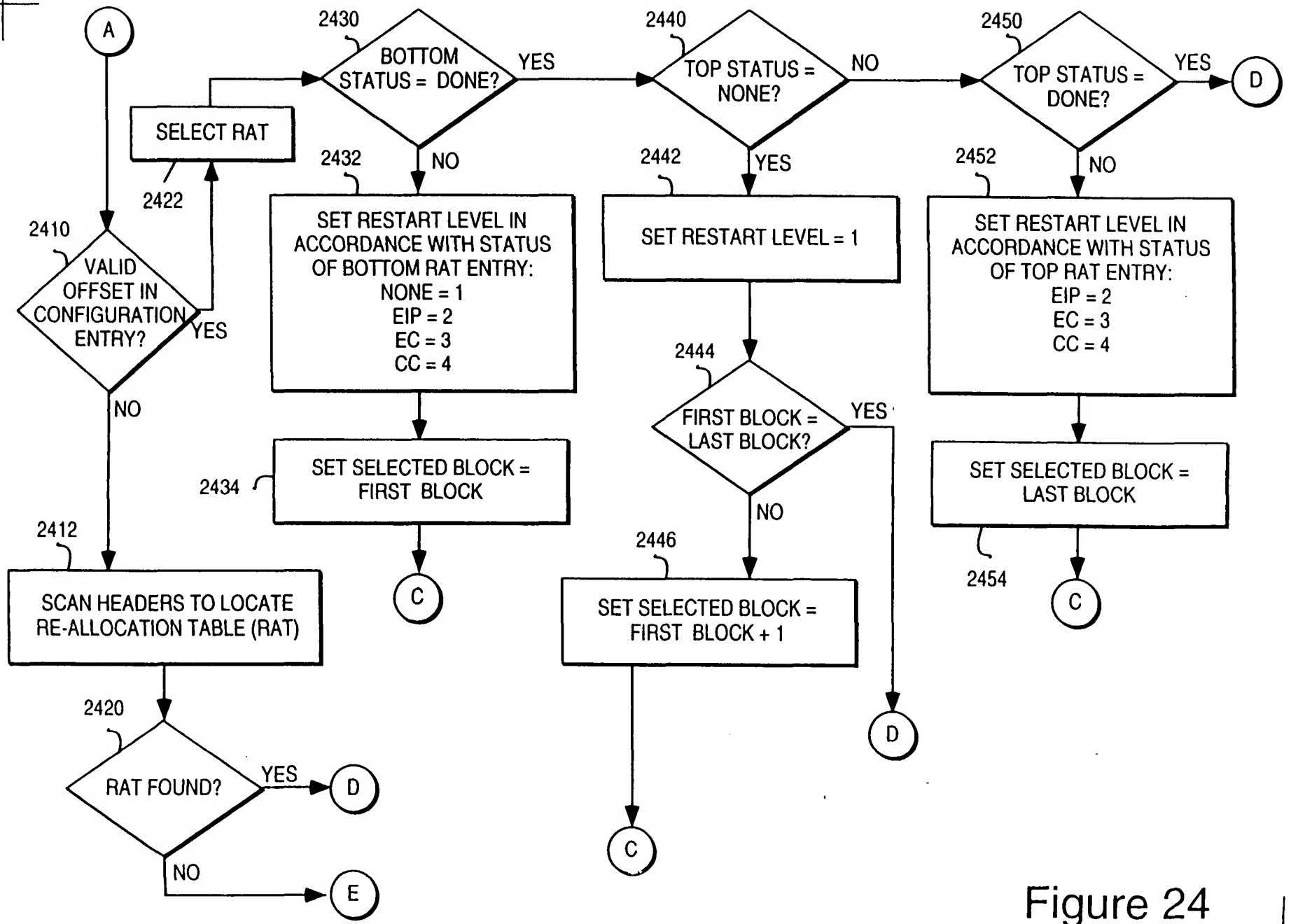
A
2410
VALID OFFSET IN CONFIGURATION ENTRY?
YES
NO
2422
SELECT RAT
2412
SCAN HEADERS TO LOCATE RE-ALLOCATION TABLE (RAT)
2420
RAT FOUND?
YES
D
NO
E
2430
BOTTOM STATUS = DONE?
YES
NO
2432
SET RESTART LEVEL IN ACCORDANCE WITH STATUS OF BOTTOM RAT ENTRY:
NONE = 1
EIP = 2
EC = 3
CC = 4
2434
SET SELECTED BLOCK = FIRST BLOCK
C
2440
TOP STATUS = NONE?
NO
YES
2442
SET RESTART LEVEL = 1
2444
FIRST BLOCK = LAST BLOCK?
YES
NO
2446
SET SELECTED BLOCK = FIRST BLOCK + 1
C
D
2450
TOP STATUS = DONE?
YES
D
NO
2452
SET RESTART LEVEL IN ACCORDANCE WITH STATUS OF TOP RAT ENTRY:
EIP = 2
EC = 3
CC = 4
SET SELECTED BLOCK = LAST BLOCK
2454
C

Figure 24

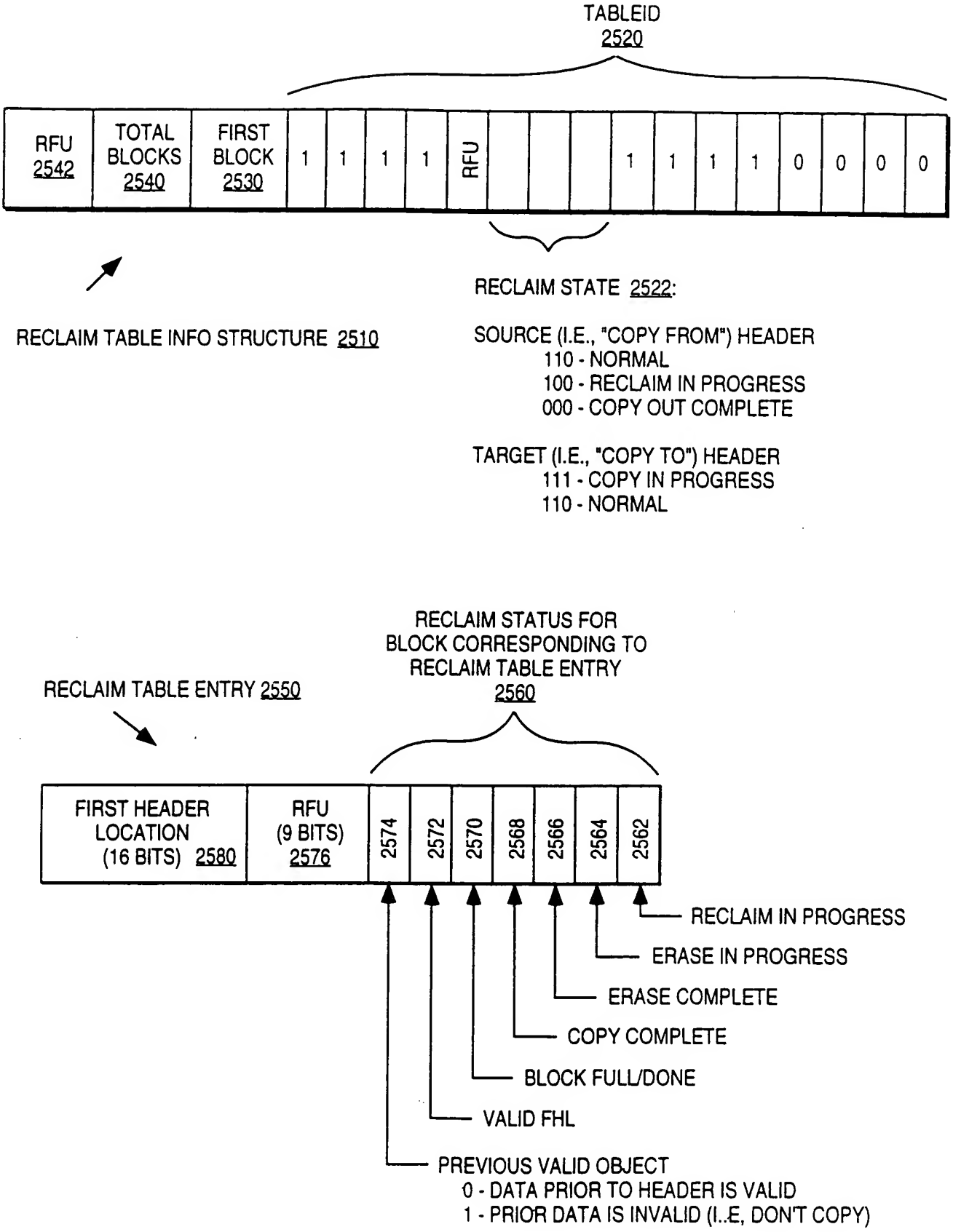
TABLEID
2520
RFU
2542
TOTAL
BLOCKS
2540
FIRST
BLOCK
2530
1
1
1
1
RFU
1
1
1
1
0
0
0
0
RECLAIM TABLE INFO STRUCTURE 2510
RECLAIM STATE 2522:
SOURCE (I.E., "COPY FROM") HEADER
110 - NORMAL
100 - RECLAIM IN PROGRESS
000 - COPY OUT COMPLETE
TARGET (I.E., "COPY TO") HEADER
111 - COPY IN PROGRESS
110 - NORMAL
RECLAIM STATUS FOR
BLOCK CORRESPONDING TO
RECLAIM TABLE ENTRY
2560
RECLAIM TABLE ENTRY 2550
FIRST HEADER
LOCATION
(16 BITS) 2580
RFU
(9 BITS)
2576
2574
2572
2570
2568
2566
2564
2562
RECLAIM IN PROGRESS
ERASE IN PROGRESS
ERASE COMPLETE
COPY COMPLETE
BLOCK FULL/DONE
VALID FHL
PREVIOUS VALID OBJECT
0 - DATA PRIOR TO HEADER IS VALID
1 - PRIOR DATA IS INVALID (I..E, DON'T COPY)

Figure 25

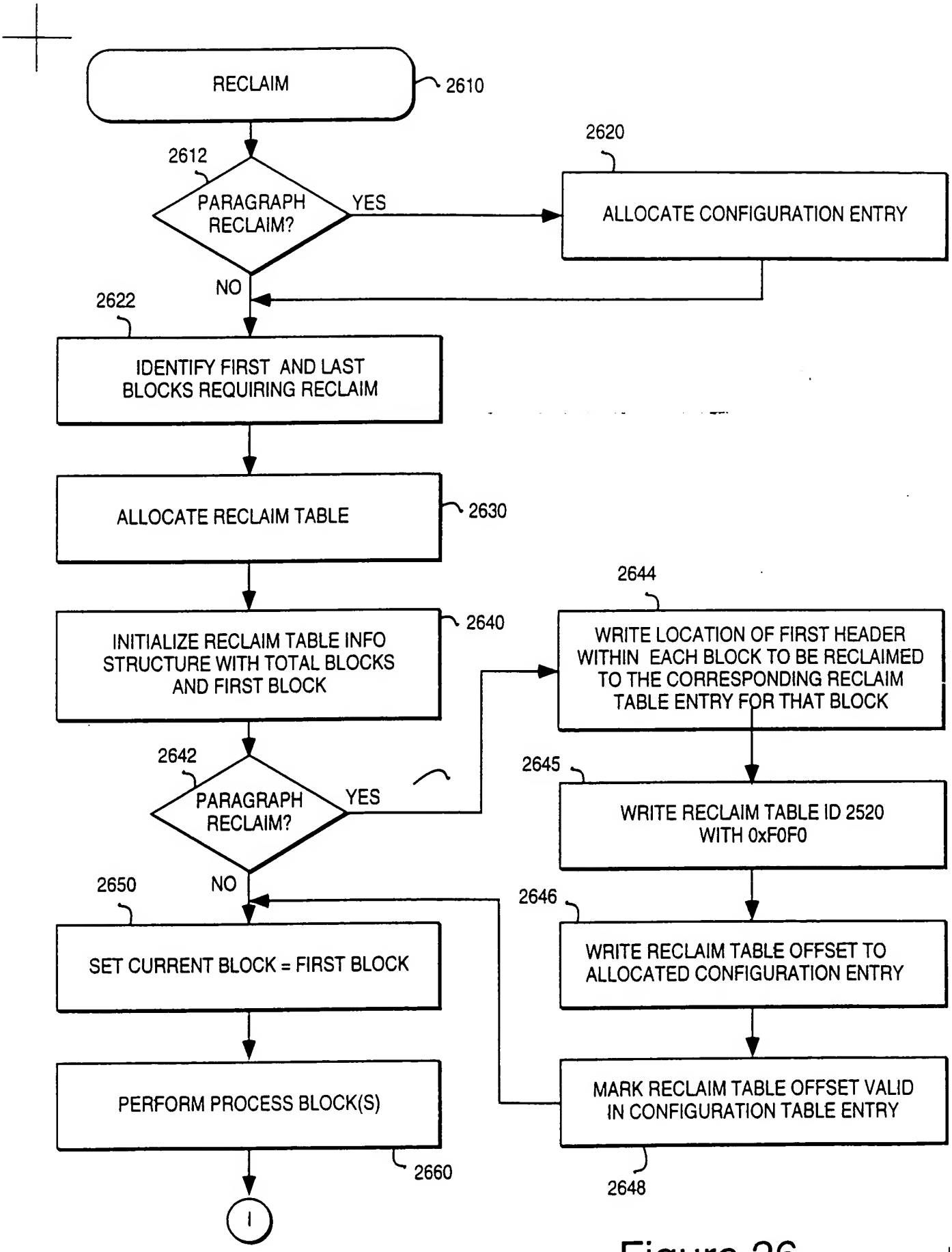
RECLAIM
2610
2612
PARAGRAPH RECLAIM?
YES
2620
ALLOCATE CONFIGURATION ENTRY
NO
2622
IDENTIFY FIRST AND LAST BLOCKS REQUIRING RECLAIM
ALLOCATE RECLAIM TABLE
2630
INITIALIZE RECLAIM TABLE INFO STRUCTURE WITH TOTAL BLOCKS AND FIRST BLOCK
2640
2644
WRITE LOCATION OF FIRST HEADER WITHIN EACH BLOCK TO BE RECLAIMED TO THE CORRESPONDING RECLAIM TABLE ENTRY FOR THAT BLOCK
2642
PARAGRAPH RECLAIM?
YES
2645
WRITE RECLAIM TABLE ID 2520 WITH 0xF0F0
NO
2650
2646
SET CURRENT BLOCK = FIRST BLOCK
WRITE RECLAIM TABLE OFFSET TO ALLOCATED CONFIGURATION ENTRY
PERFORM PROCESS BLOCK(S)
MARK RECLAIM TABLE OFFSET VALID IN CONFIGURATION TABLE ENTRY
2660
2648
1

Figure 26

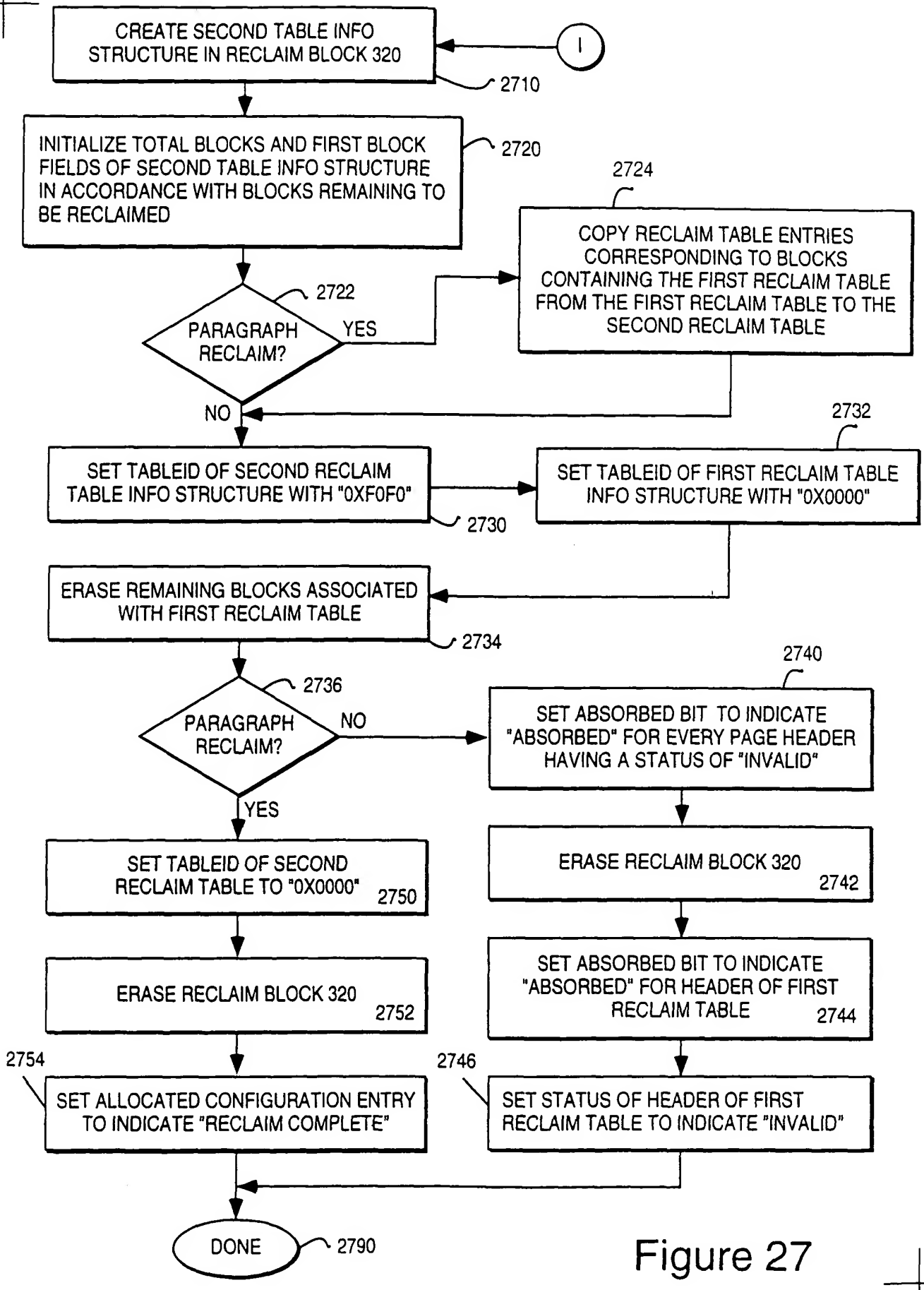
CREATE SECOND TABLE INFO STRUCTURE IN RECLAIM BLOCK 320
2710
INITIALIZE TOTAL BLOCKS AND FIRST BLOCK FIELDS OF SECOND TABLE INFO STRUCTURE IN ACCORDANCE WITH BLOCKS REMAINING TO BE RECLAIMED
2720
2724
COPY RECLAIM TABLE ENTRIES CORRESPONDING TO BLOCKS CONTAINING THE FIRST RECLAIM TABLE FROM THE FIRST RECLAIM TABLE TO THE SECOND RECLAIM TABLE
2722
PARAGRAPH RECLAIM?
YES
NO
2732
SET TABLEID OF SECOND RECLAIM TABLE INFO STRUCTURE WITH "0XF0F0"
2730
SET TABLEID OF FIRST RECLAIM TABLE INFO STRUCTURE WITH "0X0000"
ERASE REMAINING BLOCKS ASSOCIATED WITH FIRST RECLAIM TABLE
2734
2740
2736
PARAGRAPH RECLAIM?
NO
SET ABSORBED BIT TO INDICATE "ABSORBED" FOR EVERY PAGE HEADER HAVING A STATUS OF "INVALID"
YES
SET TABLEID OF SECOND RECLAIM TABLE TO "0X0000"
2750
ERASE RECLAIM BLOCK 320
2742
ERASE RECLAIM BLOCK 320
2752
SET ABSORBED BIT TO INDICATE "ABSORBED" FOR HEADER OF FIRST RECLAIM TABLE
2744
2754
2746
SET ALLOCATED CONFIGURATION ENTRY TO INDICATE "RECLAIM COMPLETE"
SET STATUS OF HEADER OF FIRST RECLAIM TABLE TO INDICATE "INVALID"
DONE
2790

Figure 27

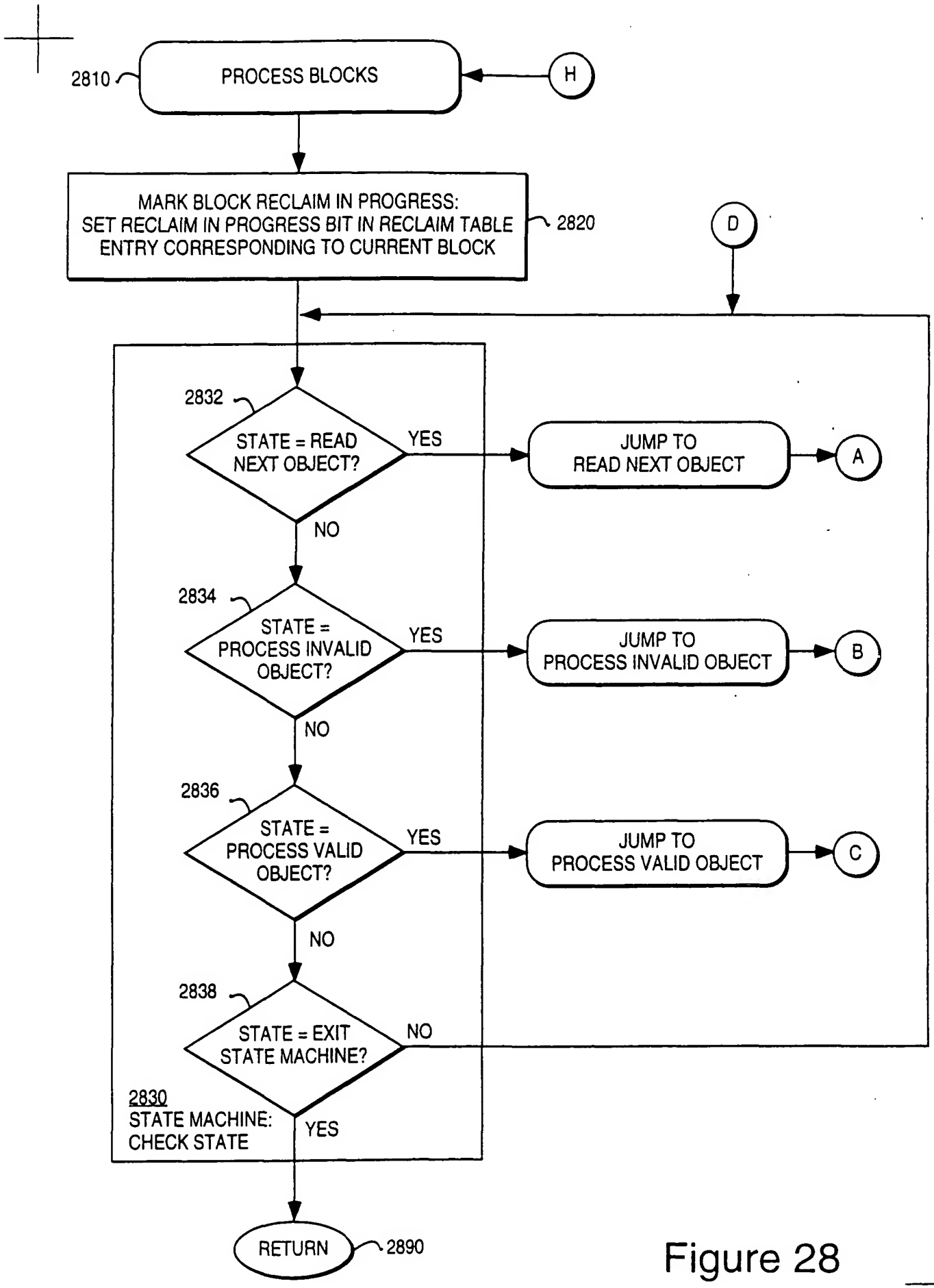
2810
PROCESS BLOCKS
H
MARK BLOCK RECLAIM IN PROGRESS:
SET RECLAIM IN PROGRESS BIT IN RECLAIM TABLE
ENTRY CORRESPONDING TO CURRENT BLOCK
2820
D
2832
STATE = READ
NEXT OBJECT?
YES
JUMP TO
READ NEXT OBJECT
A
NO
2834
STATE =
PROCESS INVALID
OBJECT?
YES
JUMP TO
PROCESS INVALID OBJECT
B
NO
2836
STATE =
PROCESS VALID
OBJECT?
YES
JUMP TO
PROCESS VALID OBJECT
C
NO
2838
STATE = EXIT
STATE MACHINE?
NO
2830
STATE MACHINE:
CHECK STATE
YES
RETURN
2890

Figure 28

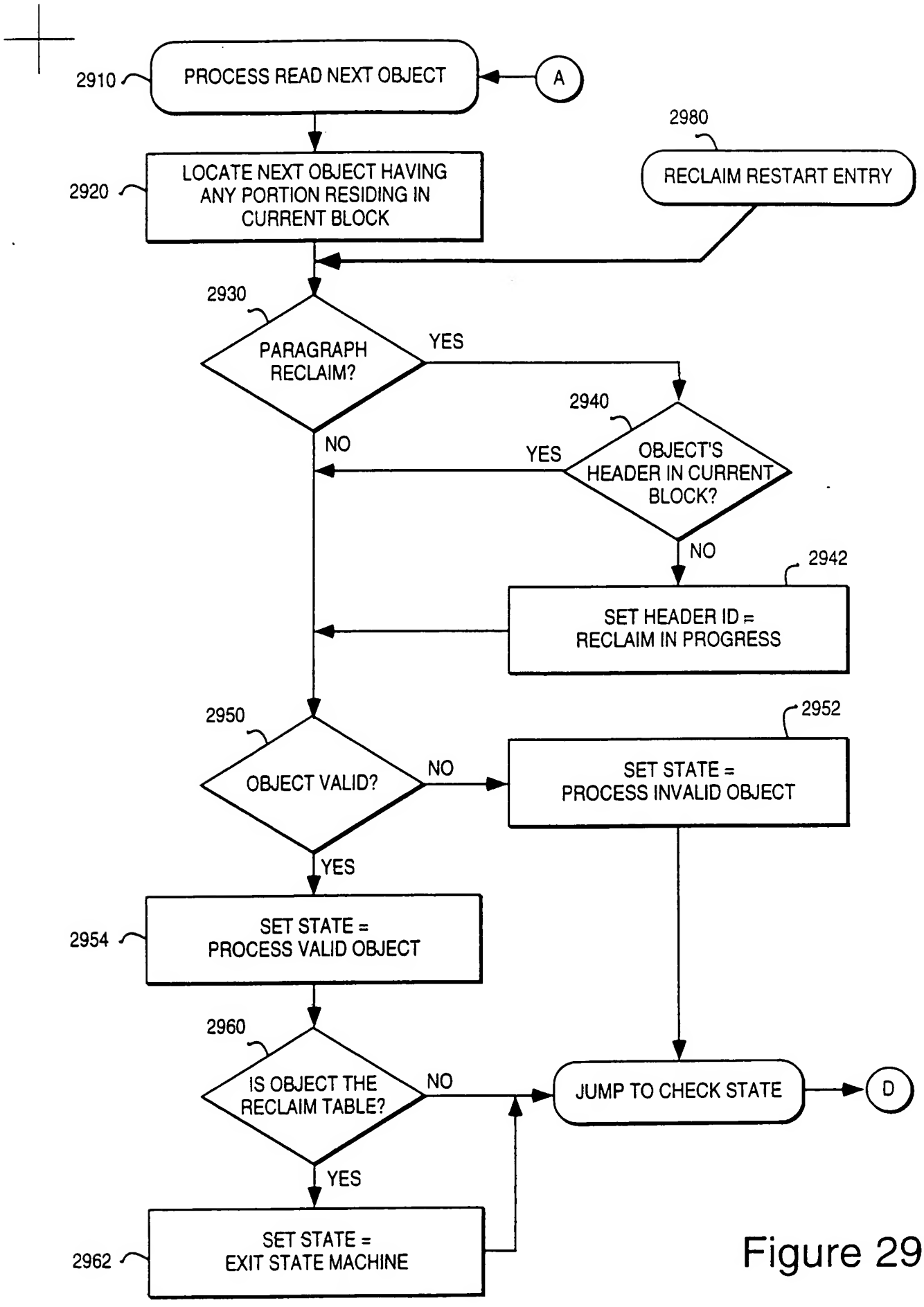
2910
PROCESS READ NEXT OBJECT
A
2980
RECLAIM RESTART ENTRY
2920
LOCATE NEXT OBJECT HAVING ANY PORTION RESIDING IN CURRENT BLOCK
2930
PARAGRAPH RECLAIM?
YES
NO
2940
OBJECT'S HEADER IN CURRENT BLOCK?
YES
NO
2942
SET HEADER ID = RECLAIM IN PROGRESS
2950
OBJECT VALID?
NO
2952
SET STATE = PROCESS INVALID OBJECT
YES
2954
SET STATE = PROCESS VALID OBJECT
2960
IS OBJECT THE RECLAIM TABLE?
NO
JUMP TO CHECK STATE
D
YES
2962
SET STATE = EXIT STATE MACHINE

Figure 29

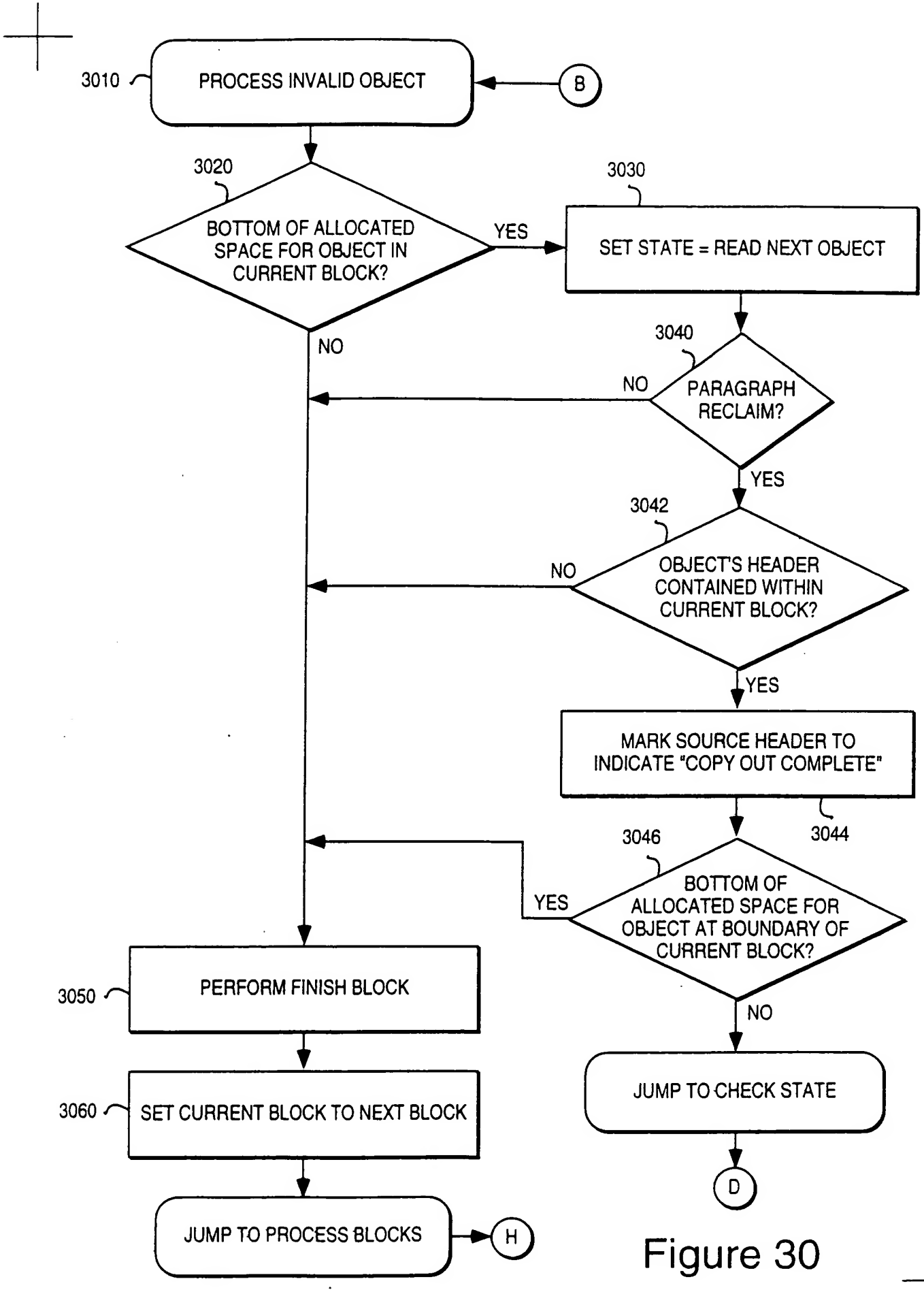
3010
PROCESS INVALID OBJECT
B
3020
BOTTOM OF ALLOCATED SPACE FOR OBJECT IN CURRENT BLOCK?
YES
3030
SET STATE = READ NEXT OBJECT
NO
3040
PARAGRAPH RECLAIM?
NO
YES
3042
OBJECT'S HEADER CONTAINED WITHIN CURRENT BLOCK?
NO
YES
MARK SOURCE HEADER TO INDICATE "COPY OUT COMPLETE"
3044
3046
BOTTOM OF ALLOCATED SPACE FOR OBJECT AT BOUNDARY OF CURRENT BLOCK?
YES
NO
JUMP TO CHECK STATE
D
3050
PERFORM FINISH BLOCK
3060
SET CURRENT BLOCK TO NEXT BLOCK
JUMP TO PROCESS BLOCKS
H

Figure 30

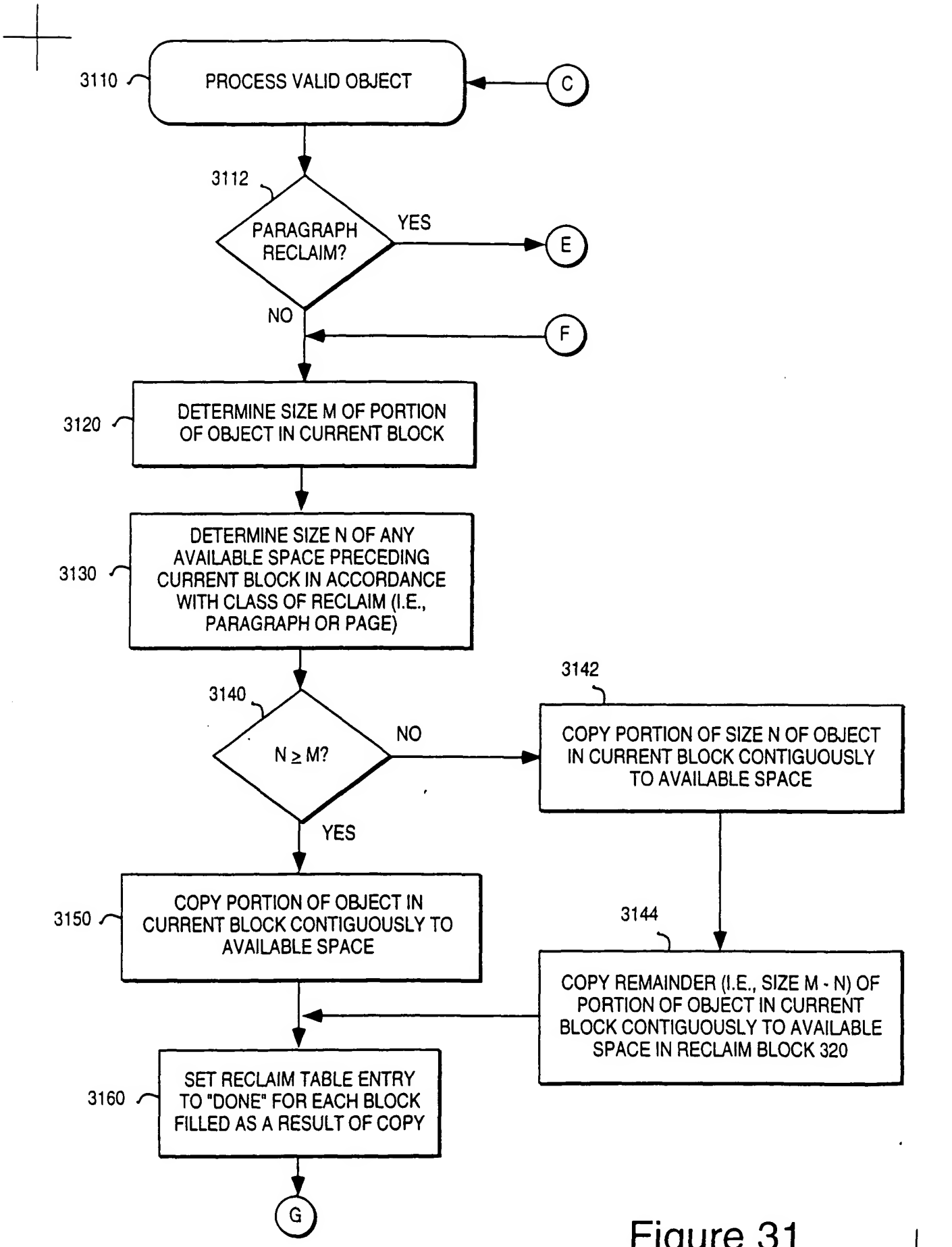
3110
PROCESS VALID OBJECT
C
3112
PARAGRAPH RECLAIM?
YES
E
NO
F
3120
DETERMINE SIZE M OF PORTION OF OBJECT IN CURRENT BLOCK
3130
DETERMINE SIZE N OF ANY AVAILABLE SPACE PRECEDING CURRENT BLOCK IN ACCORDANCE WITH CLASS OF RECLAIM (I.E., PARAGRAPH OR PAGE)
3140
N ≥ M?
NO
3142
COPY PORTION OF SIZE N OF OBJECT IN CURRENT BLOCK CONTIGUOUSLY TO AVAILABLE SPACE
YES
3150
COPY PORTION OF OBJECT IN CURRENT BLOCK CONTIGUOUSLY TO AVAILABLE SPACE
3144
COPY REMAINDER (I.E., SIZE M - N) OF PORTION OF OBJECT IN CURRENT BLOCK CONTIGUOUSLY TO AVAILABLE SPACE IN RECLAIM BLOCK 320
3160
SET RECLAIM TABLE ENTRY TO "DONE" FOR EACH BLOCK FILLED AS A RESULT OF COPY
G

Figure 31

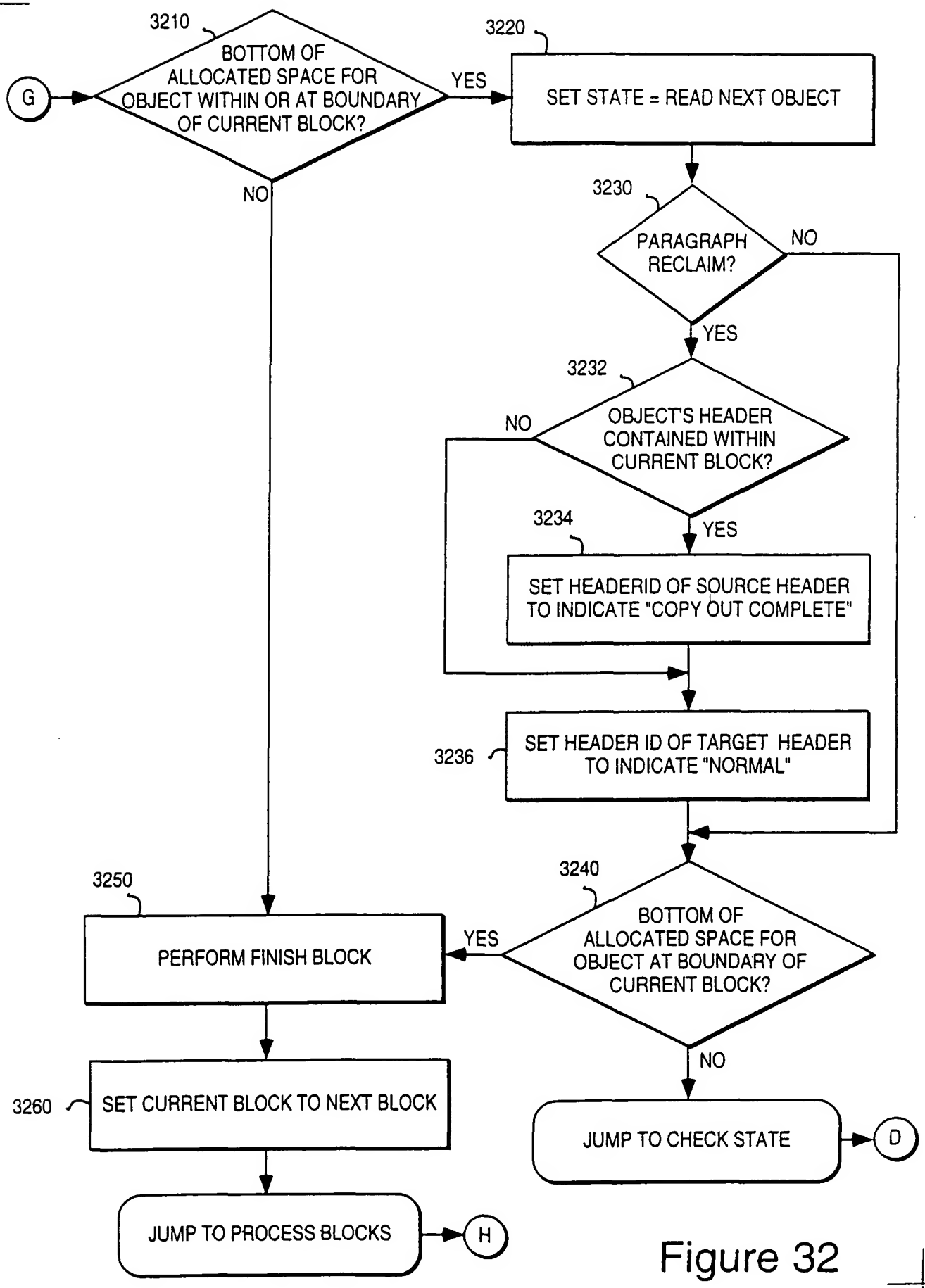
3210
BOTTOM OF ALLOCATED SPACE FOR OBJECT WITHIN OR AT BOUNDARY OF CURRENT BLOCK?
G
YES
NO
3220
SET STATE = READ NEXT OBJECT
3230
PARAGRAPH RECLAIM?
NO
YES
3232
OBJECT'S HEADER CONTAINED WITHIN CURRENT BLOCK?
NO
YES
3234
SET HEADERID OF SOURCE HEADER TO INDICATE "COPY OUT COMPLETE"
3236
SET HEADER ID OF TARGET HEADER TO INDICATE "NORMAL"
3240
BOTTOM OF ALLOCATED SPACE FOR OBJECT AT BOUNDARY OF CURRENT BLOCK?
YES
NO
3250
PERFORM FINISH BLOCK
3260
SET CURRENT BLOCK TO NEXT BLOCK
JUMP TO PROCESS BLOCKS
H
JUMP TO CHECK STATE
D

Figure 32

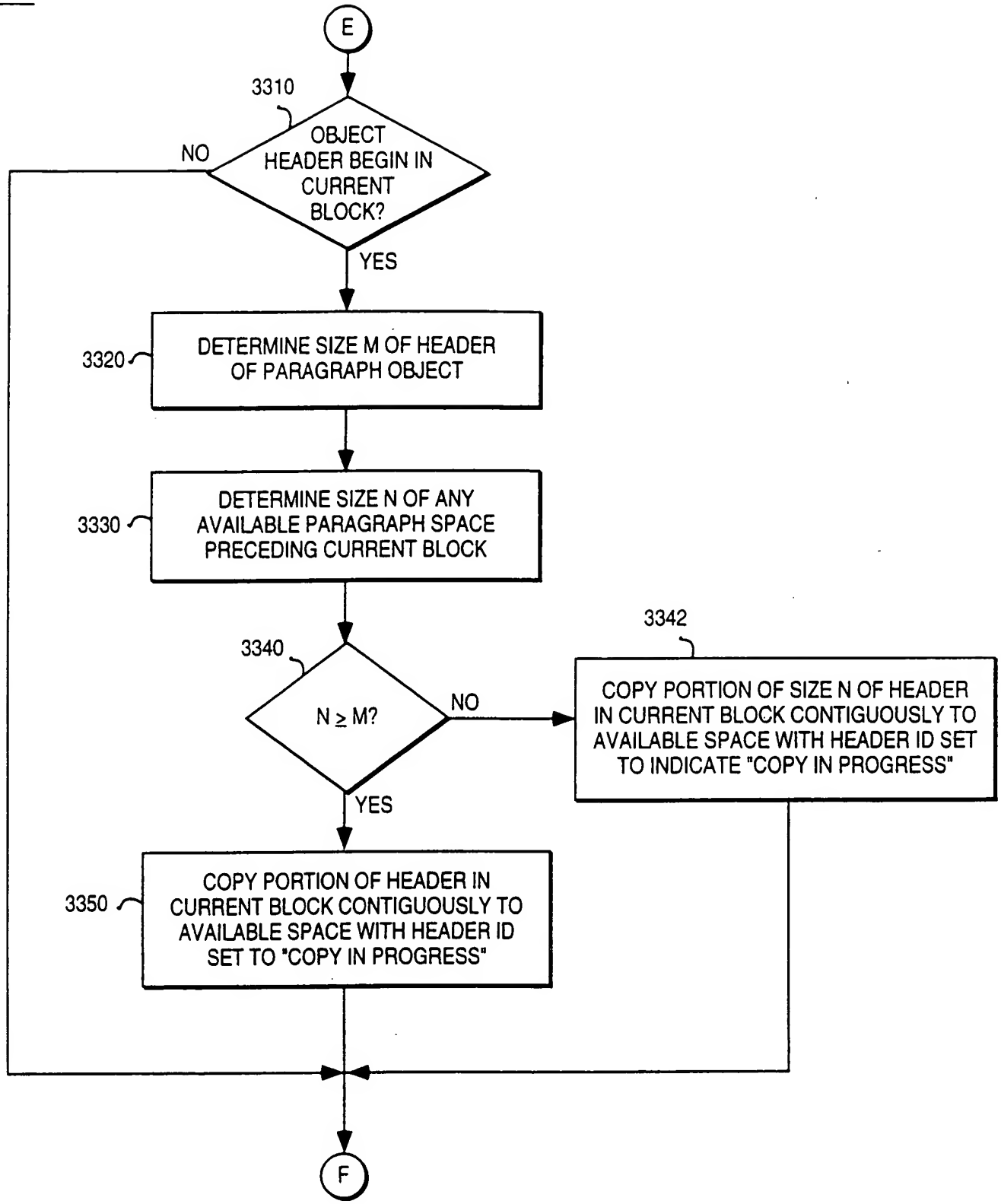
E
3310
OBJECT HEADER BEGIN IN CURRENT BLOCK?
NO
YES
3320
DETERMINE SIZE M OF HEADER OF PARAGRAPH OBJECT
3330
DETERMINE SIZE N OF ANY AVAILABLE PARAGRAPH SPACE PRECEDING CURRENT BLOCK
3340
N ≥ M?
NO
YES
3342
COPY PORTION OF SIZE N OF HEADER IN CURRENT BLOCK CONTIGUOUSLY TO AVAILABLE SPACE WITH HEADER ID SET TO INDICATE "COPY IN PROGRESS"
3350
COPY PORTION OF HEADER IN CURRENT BLOCK CONTIGUOUSLY TO AVAILABLE SPACE WITH HEADER ID SET TO "COPY IN PROGRESS"
F

Figure 33

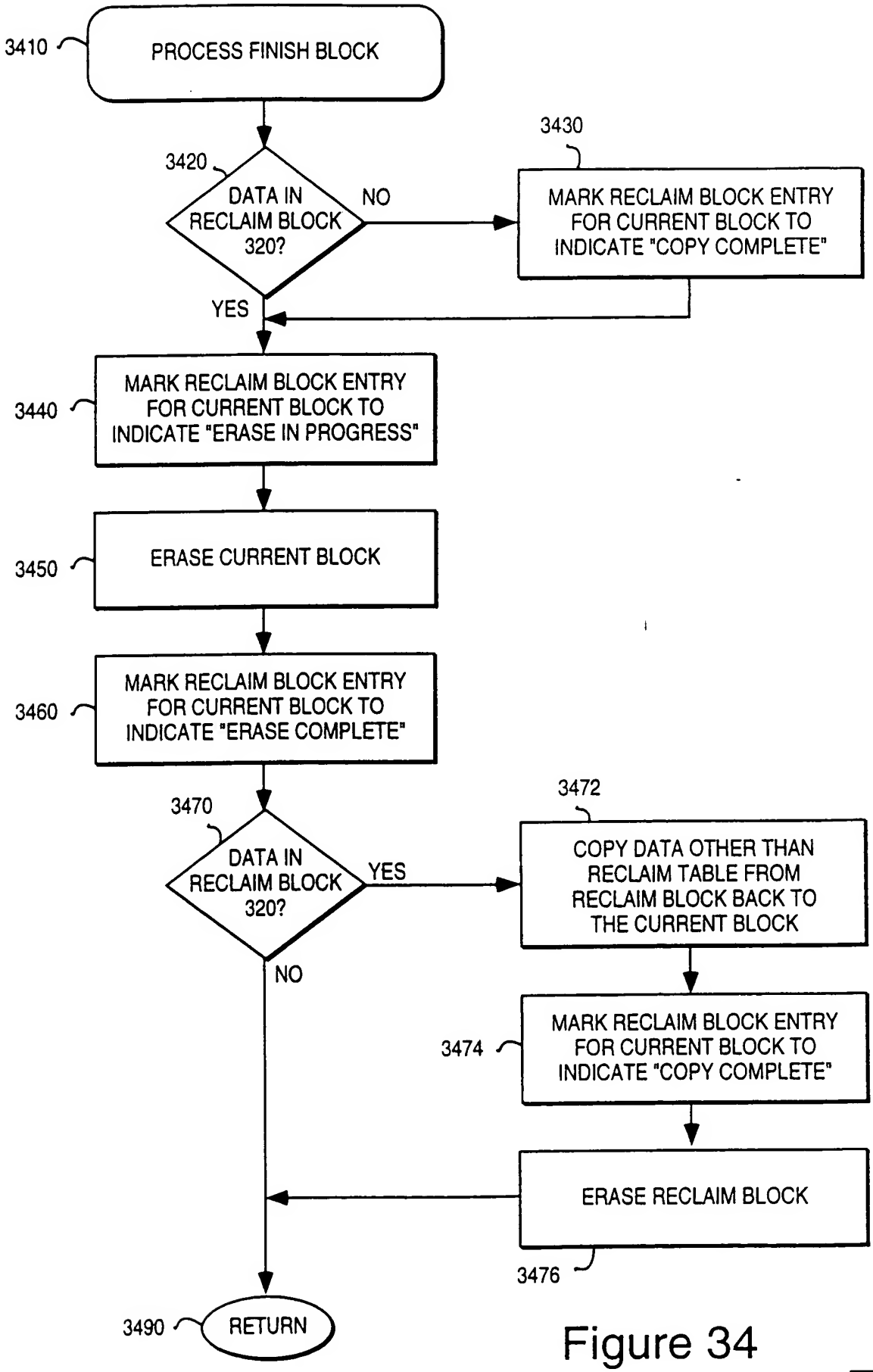
3410
PROCESS FINISH BLOCK
3420
DATA IN RECLAIM BLOCK 320?
NO
3430
MARK RECLAIM BLOCK ENTRY FOR CURRENT BLOCK TO INDICATE "COPY COMPLETE"
YES
3440
MARK RECLAIM BLOCK ENTRY FOR CURRENT BLOCK TO INDICATE "ERASE IN PROGRESS"
3450
ERASE CURRENT BLOCK
3460
MARK RECLAIM BLOCK ENTRY FOR CURRENT BLOCK TO INDICATE "ERASE COMPLETE"
3470
DATA IN RECLAIM BLOCK 320?
YES
3472
COPY DATA OTHER THAN RECLAIM TABLE FROM RECLAIM BLOCK BACK TO THE CURRENT BLOCK
NO
3474
MARK RECLAIM BLOCK ENTRY FOR CURRENT BLOCK TO INDICATE "COPY COMPLETE"
ERASE RECLAIM BLOCK
3476
3490
RETURN

Figure 34

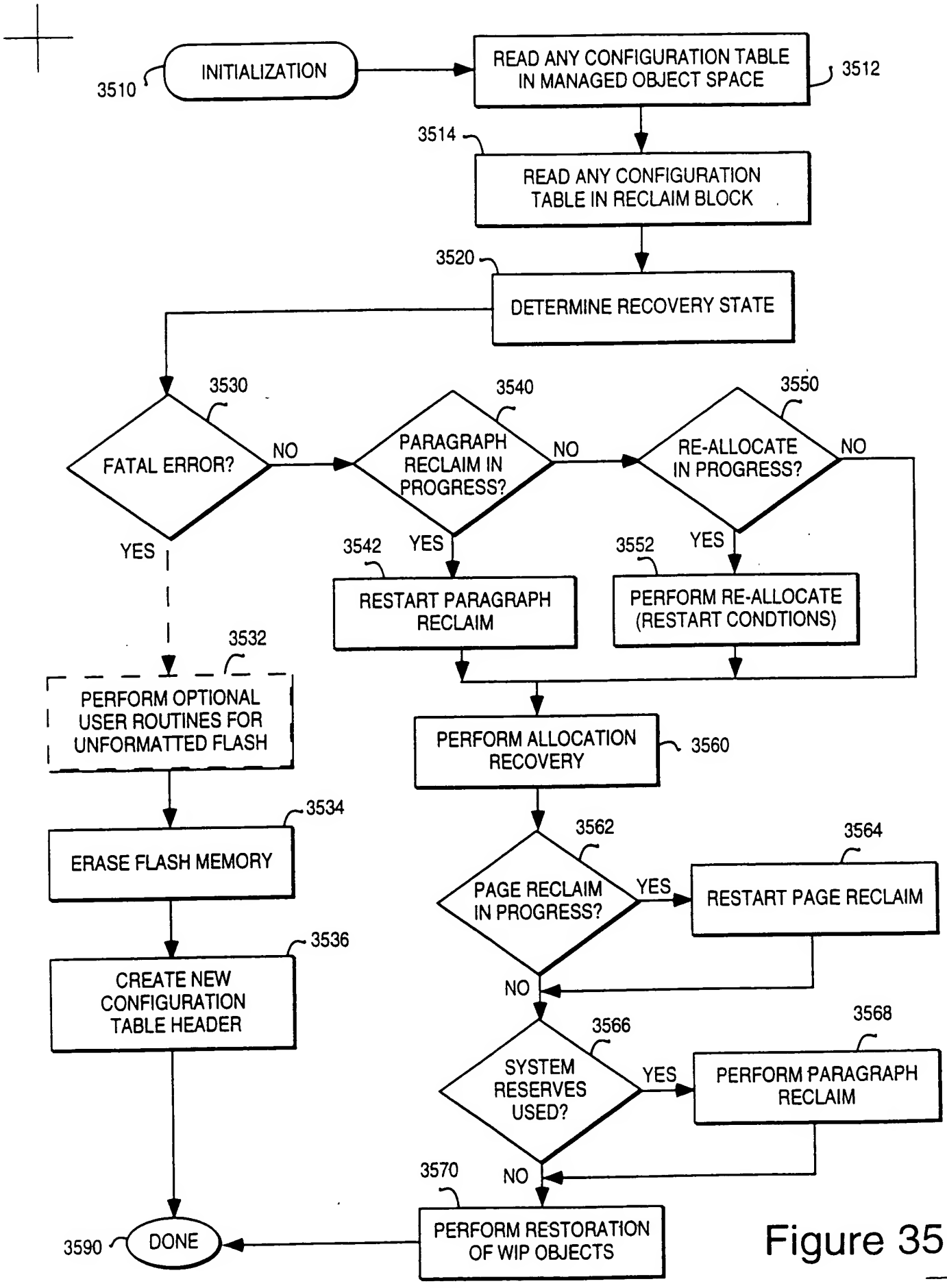
3510
INITIALIZATION
READ ANY CONFIGURATION TABLE IN MANAGED OBJECT SPACE
3512
3514
READ ANY CONFIGURATION TABLE IN RECLAIM BLOCK
3520
DETERMINE RECOVERY STATE
3530
FATAL ERROR?
NO
3540
PARAGRAPH RECLAIM IN PROGRESS?
NO
3550
RE-ALLOCATE IN PROGRESS?
NO
YES
3542
YES
RESTART PARAGRAPH RECLAIM
3552
YES
PERFORM RE-ALLOCATE (RESTART CONDTIONS)
3532
PERFORM OPTIONAL USER ROUTINES FOR UNFORMATTED FLASH
PERFORM ALLOCATION RECOVERY
3560
3534
ERASE FLASH MEMORY
3562
PAGE RECLAIM IN PROGRESS?
YES
3564
RESTART PAGE RECLAIM
3536
CREATE NEW CONFIGURATION TABLE HEADER
NO
3566
SYSTEM RESERVES USED?
YES
3568
PERFORM PARAGRAPH RECLAIM
3570
NO
PERFORM RESTORATION OF WIP OBJECTS
3590
DONE

Figure 35

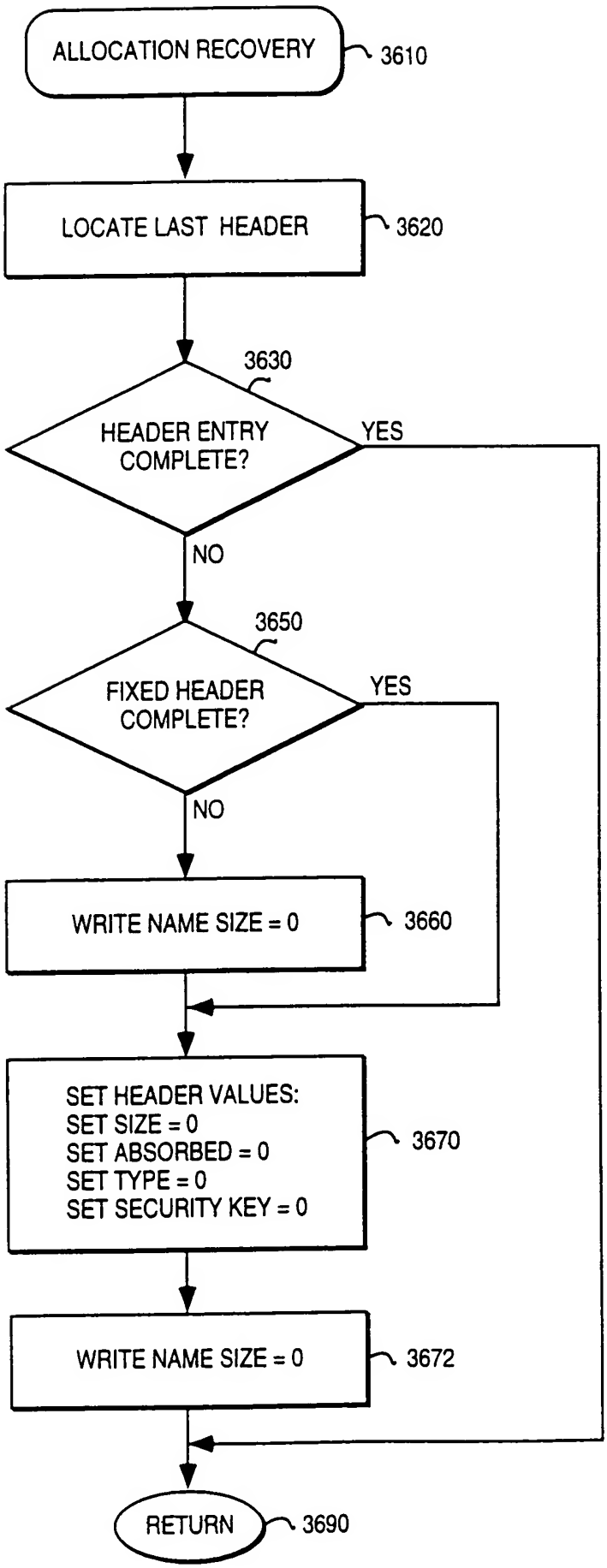
ALLOCATION RECOVERY
3610
LOCATE LAST HEADER
3620
3630
HEADER ENTRY COMPLETE?
YES
NO
3650
FIXED HEADER COMPLETE?
YES
NO
WRITE NAME SIZE = 0
3660
SET HEADER VALUES:
SET SIZE = 0
SET ABSORBED = 0
SET TYPE = 0
SET SECURITY KEY = 0
3670
WRITE NAME SIZE = 0
3672
RETURN
3690

Figure 36

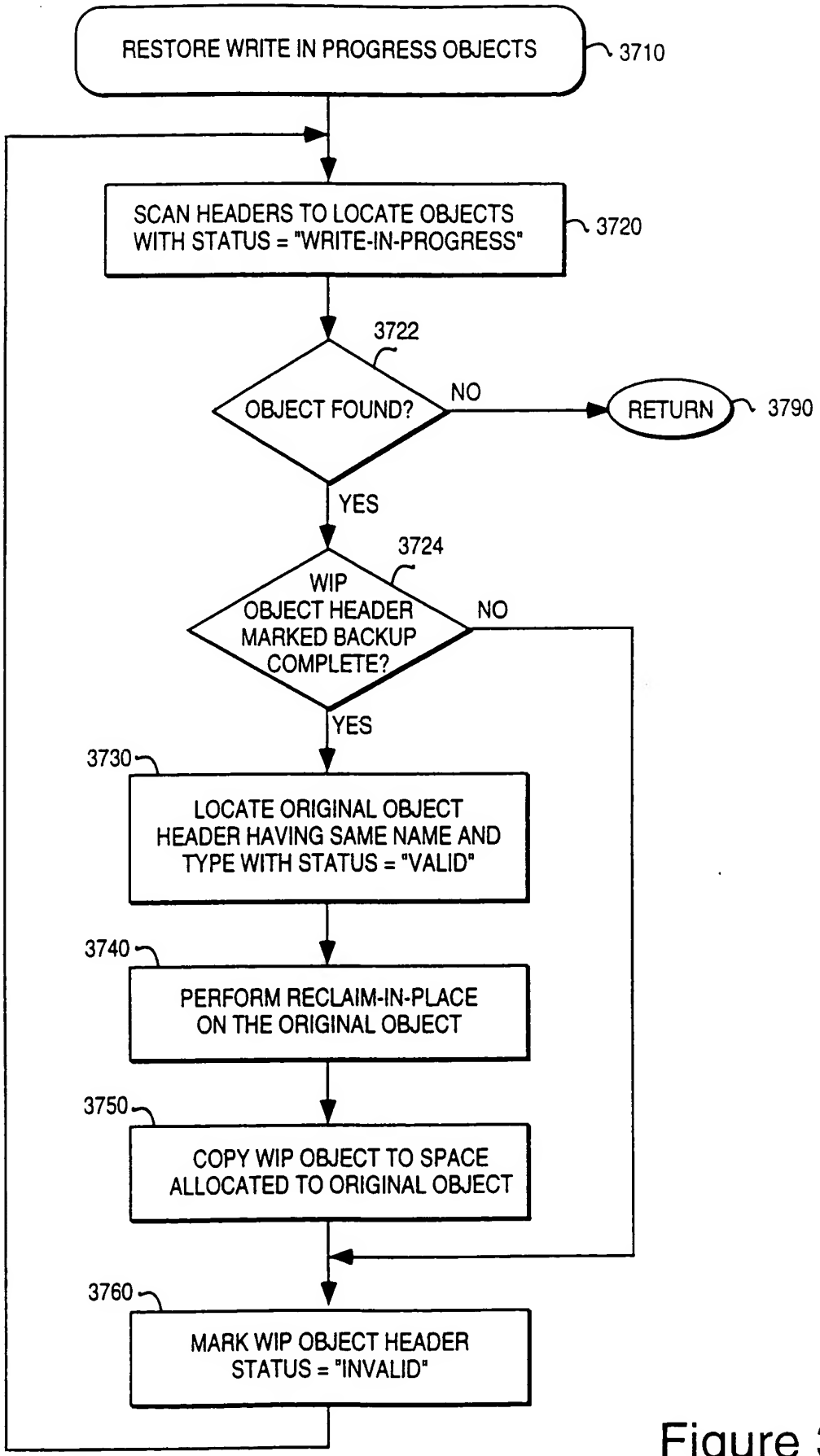
RESTORE WRITE IN PROGRESS OBJECTS
3710
SCAN HEADERS TO LOCATE OBJECTS WITH STATUS = "WRITE-IN-PROGRESS"
3720
3722
OBJECT FOUND?
NO
RETURN
3790
YES
3724
WIP OBJECT HEADER MARKED BACKUP COMPLETE?
NO
YES
3730
LOCATE ORIGINAL OBJECT HEADER HAVING SAME NAME AND TYPE WITH STATUS = "VALID"
3740
PERFORM RECLAIM-IN-PLACE ON THE ORIGINAL OBJECT
3750
COPY WIP OBJECT TO SPACE ALLOCATED TO ORIGINAL OBJECT
3760
MARK WIP OBJECT HEADER STATUS = "INVALID"

Figure 37